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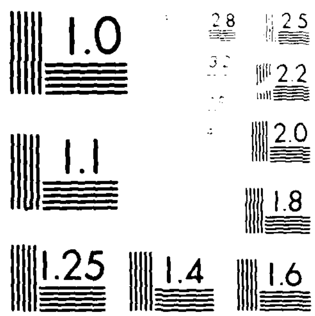

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Report 1257-02-82-CR

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Modifications To ELIM-COMPLIP and MOSLS for Mobilization Strength Planning and Management For Enlisted Personnel

By:

K.D. Midlam, Project Manager
W.E. Bartlett
E. Berge
B.W. Holz
M.J. Maloney

May 1982

MANAGEMENT SYSTEMS DIVISION

GENERAL RESEARCH CORPORATION

A SUBSIDIARY OF FLOW GENERAL INC.

7655 Old Springhouse Road, McLean, Virginia 22102

Prepared For:

Office of the Assistant Secretary of the Army
(Manpower and Reserve Affairs)
ATTN: LTC James L. Jandreau
Washington, D.C. 20310

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6

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The purpose of this document is to define modifications to parts of the FORECAST system of manpower planning models to enhance their ability to support strength planning and management in a mobilization environment.

FORECAST is the short name for "The Army Strength and Personnel Management Data Forecasting System"--an integrated family of ADP

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systems which, when fully developed, will support Army strength and personnel management data forecasting requirements in peacetime and under conditions of mobilization planning, mobilization, and return to peace.

The subsystems that are contained in FORECAST will support the strength management activities of all components of the Army--active, reserve, and civilian; officer and enlisted.

This document discusses two major subsystems of FORECAST--ELIM-COMPLIP, which deals with the enlisted portion of the active Army at the aggregate level, and MOSLS, which deals with active enlisted personnel at the MOS and grade level. In addition, specifications are presented for expansion of FORECAST's Casualty Estimation Subsystem.

Other elements of FORECAST are discussed only in terms of their interfaces with ELIM-COMPLIP and/or MOSLS. In these cases, the interface is defined and the data requirements through the interface are specified. How the elements external to ELIM-COMPLIP and MOSLS are to satisfy the requirements of the interfaces is not, in general, stipulated.

MODIFICATIONS TO ELIM-COMPLIP AND MOSLS FOR MOBILIZATION STRENGTH PLANNING AND MANAGEMENT FOR ENLISTED PERSONNEL

PURPOSE

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SUMMARY OF STUDY OBJECTIVES AND RESULTS

Design Objectives

The identification of modifications needed to use the FORECAST System as an aid to mobilization planners and for management of Army enlisted manpower during mobilization has as its major functional objectives the following:

- The employment of the ELIM-COMPLIP subsystems for management of the total enlisted force at and during mobilization and for management of each component (US Army Reserve, Army National Guard, etc.) of that force which has been mobilized.
- The utilization of the MOS-Level System to manage the enlisted force by grade and military occupational specialty in support of personnel management functions, e.g., loss projections, training requirements.
- Identification of the degrees of flexibility and options that must be built into ELIM-COMPLIP, MOS-Level System, and subsystem interfaces to accommodate enlisted manpower management as the Army transitions from peacetime planning to wartime execution and back to peacetime under a variety of mobilization manpower policies.
- Definition of data requirements for ELIM-COMPLIP and MOSLS mobilization, to include:
    - Identification of data sources.
    - Evaluation of data accuracy.
    - Specifications of data transfer processes.

Basic Design Considerations

Throughout mobilization planning, and under conditions of mobilization and/or demobilization, the FORECAST system must have the flexibility to forecast the effect of excursions and "what if" exercises.

- The system must respond to the impact of rapidly changing policies, constraints, and decisions without disturbing the capability to produce "best estimate" results under present conditions.
- The system must be able to make accurate forecasts of strength and management data during rapid changes in force structure and increased manning levels as the Army transitions from peace through several levels of mobilization. Conversely, the system must support the phasedown of the mobilization/wartime force structure and associated manpower strength and management activities.
- The FORECAST system must include in its projections, estimates of casualty losses and subsequent returns to duty.

Specific Design Features

The modifications identified as necessary for ELIM-COMPLIP and MOSLS to accommodate mobilization planning will provide:

- Time-phased training base output requirements by MOS for all levels of mobilization.
- Time-phased (10-day increments to at least 180 days) projections of trained manpower in all categories required for all levels of mobilization for the current year, the POM years, and the period of the Five Year Defense Program (FYDP), by grade and MOS.
- Determination of priorities for MOS training based on projected shortages and training duration required for the various MOSs.
- Projections of inductee calls required to achieve operating strength objectives.
- Handling of the phase-up and phase-down of strength in a common structure.
- Accounting of strengths of reservists who require Initial Entry Training.

- Specific accounting of projected strengths, gains, and losses for each category of manpower--Regular Army, Draftee, ARNG and USAR Selected Reserve, Individual Ready Reserve, Inactive National Guard, and recalled retirees.
- The maintainability of strengths in a specific OCONUS zone for specified assignment eligibility constraints.
- Adaptability to a variety of mobilization policy scenarios.

STRUCTURE OF THIS REPORT

In the four tabs which follow, a Functional Description, a System Specification, a Data Requirements Document, and an Evaluation of Army Reserve Component Yield Rate Estimation Methodologies are provided. A common set of appendices follows the tabs:

- Appendix A - Mission Element Needs Statement (MENS)
- Appendix B - Contractual Definition of Project Tasks
- Appendix C - References
- Appendix D - Terms, Abbreviations, and Acronyms
- Appendix E - List of Personnel Interviewed
- Appendix F - Personnel Policy Alternatives on Mobilization
- Appendix G - ELIM-COMPLIP Executive Briefing
- Appendix H - Study Overview - SSI's Proposed Model for Mobilization Manpower Management

In these tabs, more expository material is provided on MOSLS than on ELIM-COMPLIP. The initial production version of MOSLS is now in development; no formal documentation has been developed beyond the original Functional Description and System Specification that would provide a satisfactory overview of its current structure. On the other hand, ELIM-COMPLIP has been a production system for several years. Extensive documentation exists on this system. An executive overview of ELIM-COMPLIP has been provided as Appendix G.

Tab 1

Functional Description: Modifications To ELIM-COMPLIP and MOSLS for Mobilization Strength Planning and Management For Enlisted Personnel

By:

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M.J. Maloney

May 1982

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SECTION 1. GENERAL

The purpose of this functional description (FD) is to describe functional modifications to the two major components of the FORECAST system that are currently operational, ELIM-COMPLIP[1] and the enlisted Military Occupational Specialty (MOS) Level System (MOSLS),[2] so they can be used as an enlisted resource management system under conditions of simulated or actual mobilization. Detailed requirements are contained in the Mission Element Needs Statement (MENS) at Appendix A. This section provides background information concerning the objectives and terms of reference of the project; and describes the Appendices in which the references and terms, abbreviations, and acronyms are contained.

FORECAST is the short name for "The Army Strength and Personnel Management Data Forecasting System"--an integrated family of ADP systems which, when fully developed, will support Army strength and personnel management data forecasting requirements in peacetime and under conditions of mobilization planning, mobilization, and return to peace.

The FORECAST-Mobilization project will be completed in two phases. Phase I includes the development of a Functional Description (FD), System Specification (SS), and Data Requirements Document (RD). Phase I also includes development of a methodology for estimating reserve yield (or show) rates. The development of computer software for FORECAST mobilization planning capability will be initiated during Phase II, subject to Army approval of Phase I products. Contractual definitions of project tasks are stated in Appendix B.

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1 ELIM is an acronym for Enlisted Loss Inventory Model; COMPLIP is an acronym for COmputation of Manpower Programs using LInear Programming. ELIM-COMPLIP is also called the Total Active Army Level System of FORECAST.

2 A prototype version of MOSLS has been demonstrated, and a Phase I production version is scheduled to be operational by November 1982.

The sponsoring office for this project is the FORECAST Project Office in the Office of the Assistant Secretary of the Army (Manpower and Reserve Affairs) [OASA(M&RA)]. The Project Manager is Colonel E. R. Guthrie. The Contracting Officer's Technical Representative (COTR) is LTC James L. Jandreau.

Users of the products will be manpower resource managers at Headquarters, Department of the Army (HQDA), United States Army Military Personnel Center (MILPERCEN), and other Commands and Field Operating Agencies. Functional areas supported will include planning, programming, and budgeting; policy development; force development; and accessioning, training, and accounting for the enlisted force during simulated or actual mobilization.

The ADP and Telecommunications support will be provided by the United States Army Management Systems Support Agency (USAMSSA).

1.1 Purpose of the Functional Description. This functional description for "Mobilization Planning Using FORECAST," Contract Number MDA903-81-C-0649, 29 September 1981, is written to provide:

- The system requirements to be satisfied which will serve as a basis for mutual understanding between the user and the developer.
- Information on performance requirements, preliminary design, and user impacts including fixed and continuing costs.
- A basis for the development of the systems tests.

1.2 Project References. The references used during development of this functional description are listed at Appendix C.

1.3 Terms, Abbreviations, and Acronyms. The definition of terms, abbreviations, and acronyms used in this document may be found in Appendix D.

SECTION 2. SYSTEM SUMMARY

This section provides background information concerning the uses and purposes of the FORECAST system; a brief description of the current methods and procedures being employed to satisfy existing information requirements; a summary of problem areas with respect to current methods and procedures being employed to serve the identified purposes; a description of the modifications required to the system including capabilities and anticipated impacts; and, finally, a discussion of any assumptions and constraints that will affect the operation of the modified system.

2.1 Background. FORECAST is the short title for the "Army Strength and Personnel Management Data Forecasting System." It is a fully integrated, multi-level, modular, automated data system. It will provide to enlisted manpower managers numerical forecasts of active Army enlisted data associated with prescribed strengths; force structure; planning, programming, and budget guidance; and development of enlisted manpower policies. The elements of FORECAST are shown in Figure 2.1.

When fully developed, FORECAST will include a Total Active Army Level System (called ELIM-COMPLIP), an enlisted Military Occupational Specialty Level System (MOSLS), an enlisted Unit-Level System, Reserve Component Systems, and an Officer System. Future development will also include Department of the Army civilian employees.

2.1.1 Mobilization Planning Process. The focus of the Army's mobilization planning process is to provide the resources required to support various operational plans. It includes plans for mobilizing units, manpower, and materiel needed for implementation of an operational plan as well as the resources needed for sustainment.

- Definition. "Mobilization is the act of preparing for war or other emergencies through assembling and organizing

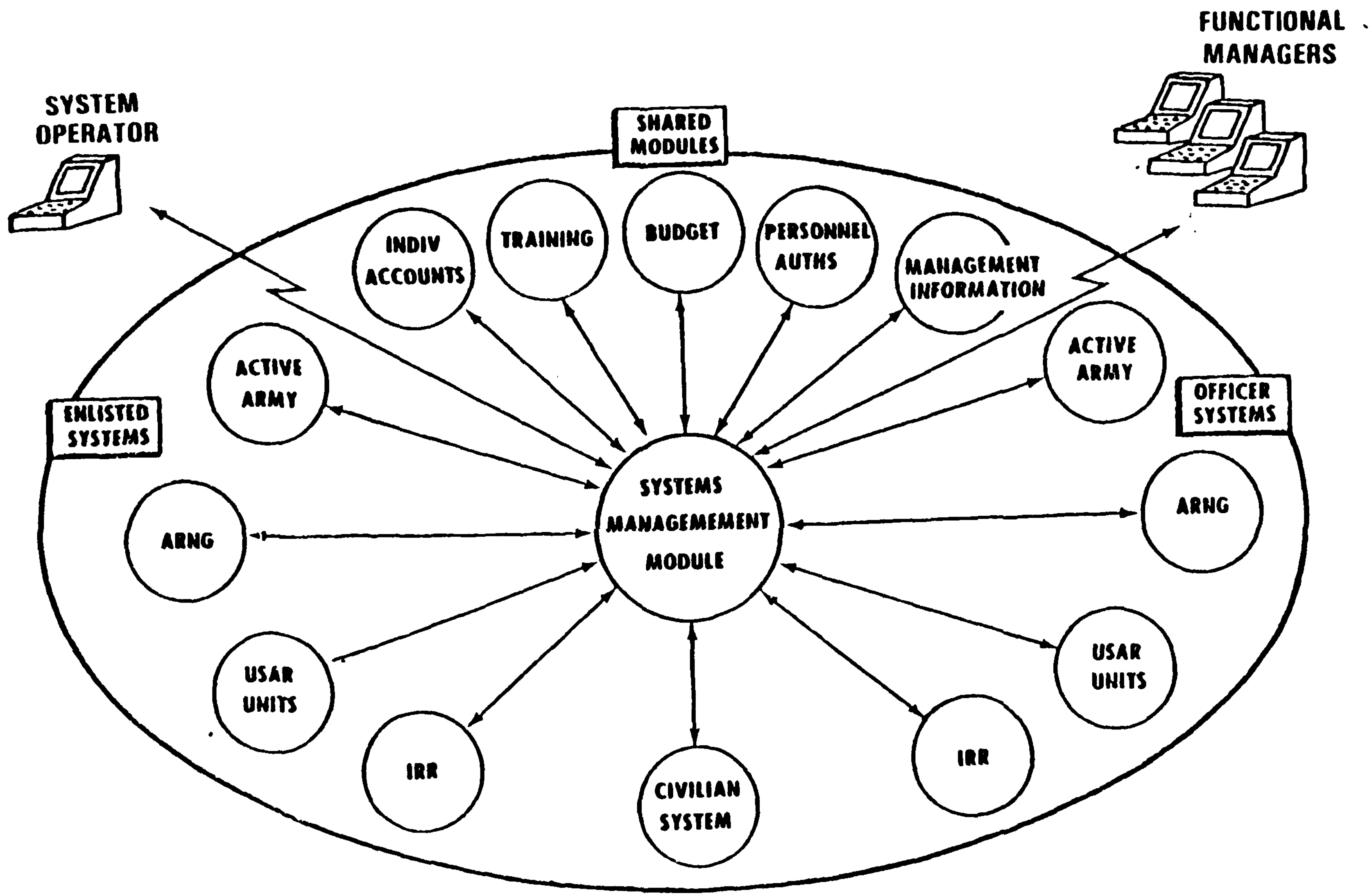


Figure 2.1. FORECAST - An Integrated Family of ADP Systems for Projection of Army Strength and Personnel Management Actions

national resources. It is the process by which the armed forces, or a portion of them, are brought to a state of readiness for war or other national emergency. This includes assembling and organizing personnel, supplies, and materiel for active military service, federalization of reserve components, extensions of terms of service, and other actions necessary to convert to a wartime posture." (Defined in reference 1.2.4.b, Appendix C.)

- Authority. The authority to order mobilization rests with the President and/or the Congress as shown in Figure 2.2. (AMOPS, Volume I).
- The Army Mobilization and Operations Planning System (AMOPS). The AMOPS has been established by HQDA as the single, integrated mobilization planning and deployment system. It outlines the mobilization planning process and responsibilities including actions at the Office of the Joint Chiefs of Staff (OJCS), HQDA, and the Major Commands (MACOMs). The purpose and scope of each volume of the AMOPS is summarized in Figure 2.3.
- Phases of Mobilization. The mobilization process is described in various documents as taking place in several phases.
  - The grouping of activities into phases is done for ease in describing the process. The Director of Operations, Readiness, and Mobilization, ODCSOPS, HQDA has developed a mobilization decision matrix, (Figure 2.4) that lists by phases the events requiring decision, staff proponency, and decision level authority. (This matrix is updated on a semi-annual basis.)
  - To avoid confusion, "phases" are not used in AMOPS to describe the mobilization process. Mobilization activities in AMOPS are grouped under the general headings of premobilization (prior to a mobilization alert order) and mobilization (after the mobilization order).

Situation	Action Required	Authority	Personnel Involved	Remarks
1. Any level of emergency.	Publish order to active duty.	10 USC 672 (d) 10 USC 3504	Volunteers from National Guard and Reserves. Retired members of the Regular forces.	May be used for any lawful purpose. Consent of the governor is required for NG members serving under 10 USC 672 (d).
2. Domestic Emergency. (Selective Mobilization)	Presidential Proclamation to disperse under 10 USC 334 & Executive Order under 10 USC appropriate to purpose of the call	10 USC 3500, 8500 & appropriate orders of higher authority; 10 USC 331,332, 333	National Guard & active forces.	May be used for: Federal Aid to states in case of insurrection (10 USC 331); Enforce federal authority (10 USC 332); Suppress interference with State & Federal law (10 USC 333).
3. Operational mission requiring augmentation of active force (100K Call-up)	Presidential Executive Order	10 USC 673b PL 96-584	Units of Selected Reserve; limited to 100,000 (all services) for up to 90 days.	President must report to Congress within 24-hours on circumstances and anticipated use of forces. May not be used in lieu of a call UP 10 USC 331 et seq., 3500, 8500, or for disaster relief.
4. Contingency operation, war plan, National emergency (Partial mobilization)	Presidential Proclamation of a national emergency & an Executive order.	10 USC 673(a)	Ready Reserve units and Individual Ready Reserve; limited to 1,000,000 (all services) for up to 2 years.	President may extend appointments, enlistments & periods of service when Congress is not in session. (10 USC 671 b)
5. War or national emergency (Full or total mobilization).	Passage of a public law or joint resolution by the Congress declaring war or national emergency.	10 USC 671(a) 10 USC 672	National Guard & Reserve units, Individual Ready Reserve, Standby Reserve, members of Retired Reserve. No numerical or time limitation unless established by Congress.	May extend enlistments in Regular and Reserve forces & extend period of active service for duration of the war plus 6 months.

Figure 2.2. Authority to Order Mobilization

DOCUMENT	PURPOSE	SCOPE
AR 500-5	ESTABLISHES AMOPS, MOBREV & MOBAC	
AMOPS I SYSTEM DESCRIPTION, RESPONSIBILITIES AND PROCEDURES	DEFINES SYSTEM FOR: 1. ARMY MOBILIZATION PLANNING AND EXECUTION 2. ARMY PARTICIPATION IN THE JOINT OPERATION PLANNING SYSTEM (JOPS)	CONSOLIDATES POLICIES AND PROCEDURES AND DEFINES RESPONSIBILITIES FOR: 1. ARMY MOBILIZATION PLANNING AND EXECUTION 2. ARMY PARTICIPATION IN JOINT OPERATION PLANNING & EXECUTION DEFINES MOBILIZATION PLANNING AS APPLYING TO: 1. ALL PLANS FOR RAPID EXPANSION OF THE ACTIVE FORCE UNDER SELECTIVE, PARTIAL, FULL AND TOTAL MOBILIZATION 2. PLANS OF HQDA, MACOMS, INTERMEDIATE HQ, INSTALLATIONS AND AC/RC UNITS DEFINES OPERATIONS PLANNING AS APPLYING TO ALL JOINT AND SUPPORTING ARMY PLANS FOR CONDUCT OF MILITARY OPERATIONS IN A HOSTILE ENVIRONMENT AND DEPLOYMENT OF ARMY FORCES TO THEATER
AMOPS II STRATEGIC EMPLOYMENT OF ARMY FORCES	PROVIDES MOBILIZATION AND OPERATIONS PLANNING GUIDANCE PERTAINING TO AVAILABILITY, ALLOCATION, AND EMPLOYMENT OF ARMY FORCES	APPLIES TO: 1. CBT, CS, CSS & GSF UNITS 2. DEPLOYABLE & NONDEPLOYABLE UNITS 3. ALL COMPONENTS
AMOPS III ARMY MOBILIZATION & DEPLOYMENT PLANNING GUIDANCE	PROVIDES ARMY AGENCIES, COMMANDS, AND COMPONENTS OF UNIFIED COMMANDS GUIDANCE REQUIRED TO PLAN FOR MOBILIZATION & DEPLOYMENT OF ARMY FORCES	CONTAINS ADMINISTRATIVE, OPERATIONAL, AND PLANNING GUIDANCE. APPLIES TO ALL COMPONENTS
AMOPS IV ARMY CRISIS ACTION SYSTEM	DESCRIBES ARMY CRISIS ACTION SYSTEM, RELATIONSHIP TO JCS CRISIS ACTION SYSTEM, PRESCRIBES HQDA CRISIS MANAGEMENT ORGANIZATION & STAFFING METHODS	DESCRIBES STREAMLINED STAFF ORGANIZATIONS OF JCS & ARMY, ARMY CRISIS STAFFING METHODS, MOBILIZATION DECISION SUPPORT PROCESS, ALTERNATE COMMAND CENTER OPERATIONS, PREPOSITIONED AUTHORITIES FOR MACOM USE, RELATIONSHIP TO EMERGENCY ACTION PROCEDURES
AMP ARMY MOBILIZATION PLAN	ESTABLISHES PROCEDURES FOR MOBILIZATION EXECUTION WITHIN HQDA & EACH MACOM	IS COMPRISED OF THE COLLECTED MOBILIZATION PLANS OF HQDA AND THE MACOMS

Figure 2.3. Army Mobilization Operations Planning Systems Documents

2.1.1.1 Organizational Responsibilities. The detailed identification of mobilization decisions, and the designation of ARSTAF proponency for each action during the mobilization process, have been identified in the preceding subsection. This subsection identifies, to users of the FORECAST system, an overview of the major responsibilities and actions necessary to ensure the timely availability of military manpower to fill and sustain the deployed force.

- Premobilization and mobilization military manpower organizational responsibilities are detailed in Section 3, Reference 1.2.4.b (Mobilization and Deployment Handbook).
- The Army plans and prepares for mobilization in peacetime. This activity is referred to as premobilization (peacetime or before mobilization). During this period, enlisted manpower plans are developed, requirements to fill and sustain the force are determined, and priorities and policies are established. The major premobilization responsibilities for military manpower are depicted in Figure 2.5.[1]
- During mobilization (i.e., after an order to mobilize) policies and priorities are reevaluated, requirements may be revised, and execution of plans is directed and monitored. The major mobilization responsibilities for military manpower are shown in Figure 2.6.

2.1.1.2 Historical Review of Mobilization Manpower Policies. Historical documentation and accounts of mobilization manpower policies covering the period from the Revolutionary War through World War I are brief. The accounts of manpower mobilization beginning in the late 1700s until America's entry into World War I relate to the weaknesses of a volunteer, short term, bounty enlistment system to procure military manpower.

[1]Figures 2.5 and 2.6 are taken from reference 1.2.4.b, with updated nomenclature.

MOBILIZATION DECISIONS

CAS PHASES	EVENT	DECISION	STAFF PROPENCY LEAD/ASSIST	DECISION LEVEL
Phase I - Situation Monitoring	Pre-Crisis (Decisions requiring actions to be now)	1. Develop SECARMY position pertaining to any delay prior to mobilization of reservists	SECARMY(M&RA) ARSTAF/SECARMY(USA)	SECARMY
		2. Establish DA policy on distribution of IRR, recalled retirees and individual fillers/replacements.	DCSPER/ARSTAF SECARMY(M&RA)	CSA/SECARMY
		3. Develop DOD policy on recruiting following mobilization.	DCSPER/ARSTAF/JCS/ JCS/SECARMY (M&RA)	SECARMY
		4. Establish mobilization training policy for Pre-trained Individual Reservists, non prior service volunteers and prior service volunteers.	DCSOPS/SECARMY (M&RA)	DCSOPS
		5. Establish policy on early fill of POMCUS/PWRS shorages.	JCS/Services/SEC ARMY/M&RA) (IL&FM)	SECDEF
		6. Establish policy on procurement of commercial substitute equipment to upgrade CONUS base.	DCSRDA/ARSTAF/ SECARMY(IL&FM)	CSA
		7. Identify social, economic, occupational safety and health, labor, manpower, and environmental regulations or laws restricting expansion of the industrial and mobilization base. Propose legislative changes and Executive Branch waivers to overcome restrictions during mobilization/national emergencies.	SECARMY(ILFM/(RDA) /OCLL/DCSRDA/DCSLOG/ COE/DCSOPS	SECARMY/ SECDEF
		8. Determine management information requirements.	DCSOPS/ARSTAF	CSA
		9. Develop mobilization real estate construction requirements to upgrade mobstation capacity	COE	COE
		10. Confirm DA Policy on deployment of round-out and and augmentation units.	DCSOPS/ARSTAF SECARMY(M&RA)	CSA/SECARMY
		11. Determine DA policy on necessity for multiple *mobilization stationing plans.*	DCSOPS/COE	DCSOPS
		12. Develop DA position/policies regarding internal and external public affairs actions pertaining to mobilization.	SECARMY(PA)/ARSTAF	CSA/SECARMY SECDEF
		13. Identify HNS Requirements to State Department	DCSLOS/DCSLOG/ SECARMY	SECDEF
		14. Develop delegation directives or instructions removing or waiving peacetime constraints on real estate and construction actions to be automatically effective on M-Day.	COE	SECARMY/ SECDEF

Figure 2.4. Mobilization Decision Matrix

CAS PHASES	EVENT	DECISION	STAFF PROPENCY LEAD/ASSIST	DECISION LEVEL
Phase I Cont'd		15. Establish policy for strategic/critical construction material utilization and conversation.	COE/DCSLOG/DCSRDA/ SECARMY/RDA)	SECDEF/FEM
		16. Approve Acquisition Plan for Mobilization.	DCSRDA/DCSOPS/ ARSTAF/SECARMY(RDA)	CSA
Phase II Assessment	Crisis Developing Assessment	1. Establish crisis response cell.	DCSOPS/ARSTAF	DCSOPS
		2. Determine force options.	DCSOPS/ARSTAF	JCS
		3. Increase Intel collection effort.	ACSI	DIA/NSA
		4. Develop EEI/EEFI	ACSI/DCSOPS	DCSOPS
		5. Recommend DEFCON changes (continuous)	DCSOPS	JCS
		6. Develop and refine DA public affairs policies pertaining to specific Secretariat and ARSTAF decisions/actions taken prior to and during Mobilizations (continuous)	SECARMY(PA)/ARMSTAF	CSA/SECARMY SECDEF
	Alert MACOMs	7. Increase Readiness Posture	DCSOPS/ARSTAF	JCS
		8. Confirm personnel and equipment distribution priorities.	DCSOPS/DCSLOG/ DCSPER	CSA
		9. Modify overseas movement criteria.	DCSPER	DCSPER
		10. Suspend movement of dependents overseas.	DCSPER	JCS
		11. Establish crisis management team	DCSOPS/ARSTAF	CSA
Phase III Course of Action Development	JCS Warning Order	1. Confirm forces to support options	DCSOPS/ARSTAF	CSA/JCS
		2. Develop service position on swing forces	DCSOPS	JCS/SECDEF
		3. Increase readiness of AC	DCSOPS/ARSTAF	JCS
		4. Selectively alert major RC commands	DCSOPS	DCSOPS
		5. Allocate additional mandays for RC training	DCSOPS/ARSTAF	DCSOPS
		6. Task HSC to identify professional fillers for RDF-A	TSG/DCSPER	PSC
		7. Request cross screening of health professionals/ support from other federal agencies	TSG/SECARMY (M&RA)	SECDEF
		8. Prioritize assignment of recalled retirees to fill essential CONUS base positions	DCSPER/SECARMY (M&RA)/ARSTAF	DCSOPS
		9. Determine developmental items suitable for accelerated acquisition - provide to DARCOM for screen.	DCSRDA/ARSTAF/ SECARMY(RDA)	JCS
		10. Review/confirm HNS requirements to State Department	DCSOPS/ARSTAF/SEC ARMY(IL&FM)(M&RA)	SECDEF
		11. Request waiver to AR 18 1 (Acquisition of ADPE)	ACSAC/SECARMY(RDA)	SECARMY

Figure 2.4. Mobilization Decision Matrix (Cont.)

CAS PHASES	EVENT	DECISION	STAFF PROPENCY LEAD/ASSIST	DECISION LEVEL
Phase III Cont'd		12. Request waiver to DOD ADPE procurement.	ACSAC SECARMY (IL&FM) (RDA)	SECDEF
		13. Request waiver from GSA for blanket delegation of procurement authority.	ACSAC/SECARMY (RDA)	GSA
		14. Confirm DA policy on accelerated graduation of trainees from training base.	DCSOPS/DCSPER/ SECARMY(M&RA)	CSA
		15. Determine/revise Army Master Urgency List.	DCSOPS/DCSPDA/ DCSLOG	DCSOPS
		16. Determine actions to be taken regarding Foreign Military Sales/Security Assistance/Mutual Security	DCOPS/DCSLOG/ SECARMY(USA)/(RDA)	SECDEF
		17. Identify resources and priorities for Civil Engineer support plans and CONUS installation support plans.	COE/ARSTAF/ SECARMY(CW)	JCS
	Preparation for NCA Decision	18. Develop service requirements for RC recall to include supporting rationale for level of mobilization required and proposal for declaration of M-Day and F-Hour.	DCSOPS/ARSTAF/ SECARMY(M&RA)	DCSOPS
		19. Identify additional legislation required, and specific items which should be addressed to NCA and Congress.	DCSOPS/ARSTAF	SECARMY
		20. Forward recommendation for mobilizing the Ready Reservists to President/Congress	JCS/SECDEF	SECDEF
Phase IV-Decision	NCA Decision	1. Approval of mobilizing the ready reservists	PRES/CONG	PRES/CONG
		2. Determination and promulgation of M-Day, F Hour	SECDEF	SECDEF
		3. Authorities under national emergency	SECARMY/SECDEF	PRES/CONG
		4. Authorize activation of HQDA wartime organization.	DAS	CSA
		5. Modify policy of assignment of IRR/SBR	DCSPER	DCSOPS
		6. Request initiation of Selective Service inductions	DCSOPS/SECARMY (M&RA)/SECDEF	CONG
		7. Propose involuntary order of delayed entry personnel to active duty	DCSPER/SECARMY (M&RA)	SECDEF
		8. Propose stop loss actions within Secretariat authority	DCSPER	SECARMY
		9. Initiate mobilization of Standby Reserve	DCSPER/DCSOPS/ SECARMY(M&RA)	SECDEF
		10. Induction of health care professionals through age 45	TSG/DCSPER/ SECARMY(M&RA) SECDEF	CONG
		11. Implement civilian military contingency hospital plan/use of beds from VA hospitals	TSG/SECARMY (M&RA)	SECDEF

Figure 2.4. Mobilization Decision Matrix (Cont.)

MOBILIZATION DECISIONS

CAS PHASES	EVENT	DECISION	STAFF PROPENCY LEAD/ASSIST	DECISION LEVEL
Phase IV - Cont'd		12. Resource mob construction requirements	COF/COA/SECARMY (IL&FM)	COE
		13. Accelerate/terminate/curtail ongoing military construction program.	COE/SECARMY (IL&FM) (OCLL)	COE
		14. Identify civil projects for elimination/ curtailment.	COE/SECARMY (CW)	COE
		15. Activate HQDA COOP.	DCSOPS/ARSTAF	CSA/JCS
		16. Initiate involuntary call to active duty - retired RA and Reserve personnel	DCSPER/ARSTAF/ RCPAC/SECARMY (M&RA)	SECDEF/PRES
		17. Execute provisions to provide relief from civilian end strength ceilings.	DCSPER/SECARMY (M&RA)(OCLL)	SECDEF
		18. Provide authority to preposition surface transportation assets.	DCSLOG/SECARMY	SECDEF
		19. Develop DA position pertaining to public announcements regarding the mobilization order.	SECARMY(PA)/ARSTAF	SECARMY/ SECDEF
Phase V - Execution Planning	Alert MACOMS/NGB	1. Alert Order to MACOMS/RCPAC/NGB	DCSOPS/ARSTAF/NGB	DCSOPS
		2. Request to recapture facilities	COE/SECARMY(IL&FM)	SECARMY/ SECDEF
		3. Forward emergency legislation for authority to exceed budget program.	SECARMY(IL&FM) (OCC)/ARSTAF	SECDEF
	Issue Mob Order	4. Dispatch unit alert message.	DCSOPS/ARSTAF/NGB	DCSOPS
		5. Dispatch mob order.	DCSOPS/ARSTAF	DCSOPS
		6. Initiate requests for stop loss actions beyond authority of SECARMY	DCSPER/SECARMY (M&RA)	SECDEF
		7. Request for release from applicable regulations and laws.	ARSTAF/TJAG SECARMY (OGC)	CSA/SECARMY SECDEF
		8. Release select purpose code stocks	DCSLOG	DCSLOG
		9. Request COMSEC monitoring in NCR	ACSI/DCSOPS	SECDEF
		10. Reorient civil works	COE/SECARMY (CW)	SECARMY
Phase VI Execution	Continue Assessment JCS Execute Order Control and coordinate Mobilization Execution	1. Issue deployment directive	JCS	SECDEF
		2. Determine effect of distribution priorities and develop emergency measures required to overcome post M day personnel shortfalls.	DCSPER/DCSOPS	CSA

Figure 2.4. Mobilization Decision Matrix (Cont.)

CAS PHASES	EVENT	DECISION	STAFF PROPENCY LEAD/ASSIST	DECISION LEVEL
Phase VI Cont'd		3. Determine effect of distribution priorities and develop emergency measures required to overcome post M-day shortfall of materiel.	DCSLOG/DCSOPS	CSA
		4. Determine emergency adjustments to mobilization stationing necessary to overcome post M day shortfall in facilities.	ACE/DCSOPS	CSA
		5. Determine emergency measures necessary to overcome shortfalls in mobilization transportation capabilities.	DCSLOG/DCSOPS	JFB/JCS
		6. Advise JCS/NCS on force capabilities and shortfalls.	DCSOPS/ARSTAF	CSA
		7. Develop service requirements for increased level of mobilization required to eliminate shortfalls.	DCSOPS/ARSTAG	CONG
		8. Develop Army manpower induction requirements from Selective Service	DCSPER/SECARMY (M&RA)	ASSISTANT SECDEF (MPA&L)
	Monitor deployment of forces	9. Determine force substitutions necessary to make available the time phased force requirements of the supported commander(s).	DCSOPS/FORSCOM	CSA
		10. Develop Army position on impact of deployment activities on Army capability to support other contingencies.	DCSOPS/ARSTAF	CSA
		11. Develop courses of action to resolve transportation movement problems.	DCSLOG/DCSOPS	HDA/JFB/JCS
		12. Determine availability of nuclear weapons and delivery systems required to support military operations.	DCSOPS	CSA
		13. Determine availability of chemical munitions and agents and chemical units to support military operations.	DCSOPS	CSA
	Monitor deployment of personnel replacements and logistics	14. Develop courses of action to adjust deployment of personnel replacements to meet requirements of the supported commander(s) based on actual casualties.	DCSPER/DCSOPS	CSA/HDA
		15. Develop courses of action to adjust deployment of materiel/supplies to meet requirements of the supported commander(s) based on actual attrition/consumption.	DCSLOG/DCSOPS	CSA/HDA
		16. Prioritize medical materiel shortages for DLA/DPSC shipments.	TSG DCSLOG	DCSOPS

Figure 2.4. Mobilization Decision Matrix (Cont.)

MOBILIZATION DECISIONS

CAS PHASES	EVENT	DECISION	STAFF PROPENCY LEAD/ASSIST	DECISION LEVEL
Phase VI Cont'd		17. Adjust allocation of automation and communication assets to support military operations.	ADCSOPS CA/DCSLOG	DCSOPS
	Expand the training base	18. Determine adjustments necessary to provide training structure and assets to support the mobilization training base.	DCSOPS/DCSLOG	DCSOPS
		19. Adjust the Army Mobilization Program for individual training in accordance with projected accessions and trainee output requirements.	DCSOPS/DCSPER	DCSOPS
	Obtain additional funding to provide required resources	20. Determine the adequacy of reprogramming measures.	COA/ARSTAF	SECARMY
		21. Submit supplemental budget request.	COA/ARSTAF	CONG
	Theater evacuation	22. Develop Army position on supportability of the prescribed medical evacuation policy.	TSG/ARSTAF	JCS
		23. Adjust priorities for backhaul from theaters of operation.	DCSLOG/DCSOPS	HDA/EUR JCS
	Prepare for trans attack and post-attack operations	24. Determine forces and resources available to support civil defenses operations.	DCSOPS/ARSTAF	JCS/NCA
		25. Develop Army position on measures necessary for the defense of CONUS.	DCSOPS/ARSTAF	JCS/NCA

Figure 2.4. Mobilization Decision Matrix (Cont.)

MAJOR PREMOBILIZATION RESPONSIBILITIES FOR MILITARY MANPOWER

HQDA: Develops time-phased mobilization requirements

Develops priorities for use of available resources at mobilization

Estimates time-phased requirements from Selective Service System (SSS)

Establishes policies and guidance for the peacetime management and utilization of all categories of military manpower. Includes: preassignment; reception; processing; training; assignment on mobilization

Establishes policy on use of MEPCOM and military support of the SSS on mobilization

Monitors development of supporting execution plans

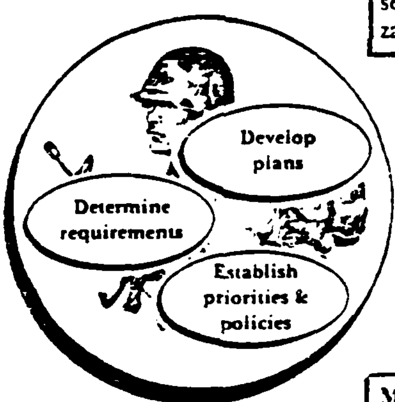
Designates units for inactivation or drawdown on mobilization

MILPERCEN: Manages active force personnel to meet mobilization requirements

RCPAC: Manages PIM, SBR, retired individuals

Administers HQDA personnel actions and management for selected reserve personnel.

Prepares and executes plans for personnel mobilization.



TRADOC: Prepares plans for postmobilization training for predicted MOS requirements

MEPCOM: Prepares execution plans, to include interface with SSS

Mobilization Stations: prepare plans to receive, process, and train mobilized individuals

Figure 2.5

MAJOR MOBILIZATION RESPONSIBILITIES FOR MILITARY MANPOWER

ALERT

HQDA: Reviews and revises time-phased mobilization requirements and determines available resources

Reviews and revises:

- Priorities for use of available resources
- Estimated time-phased Selective Service System (SSS) requirements
- Policies and guidance for use of all categories of military manpower. Includes: reception; processing; training; assignment; distribution

Reviews supporting execution plans and orders execution if not automatic

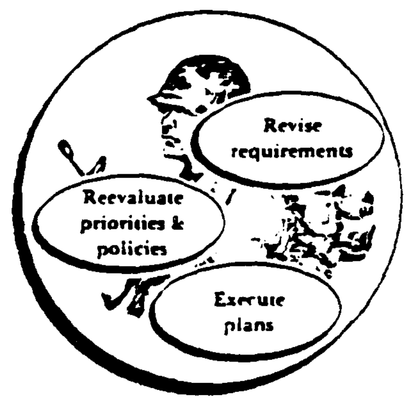
Reviews policy on use of MEPCOM and military support of SSS

Reviews lists of units identified for inactivation or drawdown

Acts on requests for exemption or delay in reporting for duty

RCPAC: Executes mobilization plans

MEPCOM: Executes plans to interface with SSS



MILPERCEN: Manages manpower distribution

Executes plans and issues instructions to installation commanders for changes to personnel distribution

TRADOC: Prepares to execute post mobilization training plans

Mobilization Stations: Prepare to receive, process, and train assigned individuals

Figure 2.6

The United States entered World War I without any precedent for ensuring the timely availability of manpower to fill and sustain a deployed force. The theory of mobilization was that the Regular Army formed the first line of defense; the Militia (National Guard) the second, and the Volunteers, the third. The only means of augmenting the Army, which had a force of 213,500 when the US declared war on Germany on 6 April 1917, was by voluntary enlistments.

It soon became apparent that compulsory service was a necessity. Legislation was drafted embodying the idea of selective service; thus was born the "Selective Service Act of May 18, 1917." For the first time in its history, the US created a legislative basis on which to raise an Army. The Army increased in strength to over 3,600,000 men by the time the armistice was signed 18 months later. Of this number, over 877,000 were enlistments.

Although the Selective Service Act of 1917 was sound, it was not perfect. Its serious weakness was the provision which continued voluntary enlistments, resulting in confusion and uncertainty in the management of the Selective Service System, and the inequitable distribution of quality among the Services.

In the period between World War I and World War II, little was done to maintain an adequate force. At the beginning of World War II in Europe (September 1939), the enlisted strength of the Army stood at 174,000. The War Department remained aloof to a peacetime Selective Service draft; however, events in Europe during the summer and fall of 1940 combined to produce a major peacetime mobilization effort in the United States including the passage of the "Selective Service Act of 1940." The attack on Pearl Harbor on 7 December 1941 marked the end of about 15 months of peacetime premobilization, and the beginning of wartime mobilization. By war's end, the actual strength of the Army exceeded 8,291,000.

The mobilizations for the Korean Conflict, the Berlin Crisis, and Vietnam in 1968 were partial and each successively smaller in the number of reserves mobilized.

- The Korean mobilization was an improvised process. Reserve manpower resources were insufficient to implement mobilization plans. Equipment and facilities were inadequate to support rapid training of combat-ready units. Mobilization planning was deficient in anticipating and forecasting requirements for oversea replacements and fillers for activated units. The poorly planned use of reserve component units and perceived inequities in calling inactive individual reservists while not calling active, paid reservists were the causes for the policy later announced by Congress that the reserve component units would be called up in national emergencies prior to levies on Individual Ready Reserve manpower pools.
- The mobilization that resulted from the Berlin Crisis was unlike previous mobilizations. The major differences were an absence of hostilities, nondeployment of major reserve component units, and the smaller scale of mobilization. It was a partial mobilization designed to deter rather than fight a war. As in previous mobilizations, the ARNG and USAR units had not been maintained in peacetime at, or near, full strength.
- The 1968 partial mobilization occurred 3 years after the US had committed ground troops to combat operations in Vietnam. The number of reserve units mobilized was so small that the general public questioned the need for mobilization as did the personnel mobilized. The total number mobilized was about 1.3% of the active Army strength, and less than 3% of paid drill strength. The 1968 mobilization provided a liberal exemption criterion that resulted in the loss to the mobilized reserve units of pretrained manpower.

An unique aspect of the partial mobilizations following World War II was the close control that the headquarters of the defense establishment maintained over manpower resources in the field. Life cycle personnel management functions, which during World Wars I and II would have been handled by the Theater Commander, became matters of great concern to senior managers in Washington--resulting in greater centralization of mobilization manpower management and development of automated personnel systems to forecast timely, accurate, and consistent strength data.

From this brief review of the manpower practices of past conflicts in which the nation has been involved, the following "lessons learned" have emerged:

- Manpower management systems should not be constrained in their design to any narrow specification of what kind of mobilization may be required in the future.
- Development of the force structure, determination of manpower requirements and manpower allocation, procurement, management and distribution must be supported by a system that looks ahead in forecasting strengths, gains, and losses over an extended period.
- Over-classification of specialists led to large scale reclassifications, especially after the replacements arrived overseas, particularly during World War II. Unneeded specialists clogged the replacement pipeline to the deployed force at the expense of combat-trained soldiers. Proper allocation of trained manpower starts with accurate forecasting of requirements by skill and grade.
- Systems that support the manning and management of the Army must be able to forecast individual and unit manpower data.
- Tight controls on assignment of trained manpower to sustain the mobilized force are required to ensure optimum use of available resources with maximum effectiveness.

- The forecasting and accounting system must include and identify by separate component (USAR, ARNG, RA, AUS) all persons of the mobilized force.
- Manpower required to sustain a full or total mobilization effort usually cannot be obtained entirely through volunteers; thus, conscription becomes the fairest and most efficient means of obtaining military manpower. To ensure equitable distribution of quality, enlistments have to be controlled in a mobilization draft environment.
- Manpower losses during previous mobilizations were exacerbated by failure to impose "stop-loss" actions immediately upon mobilization, thus allowing substantial numbers of active personnel to leave the force voluntarily after M-Day. Forecasting systems must be able to project the impact of "stop-loss" actions on the other hand and extensions of terms of service for varying periods on the other.

The centralization of manpower management defined above led to a recognized and urgent need for an integrated ADP system that would support Army strength and personnel management data forecasting requirements in peacetime and under mobilization conditions. The improvements in the FORECAST system described in this FD meet this need.

2.1.2 FORECAST System Concept. In concept, FORECAST is an integrated family of ADP systems that will support Army strength and personnel management data forecasting requirements in peacetime and under conditions of mobilization. Types of personnel included in the forecasts are officers and enlisted soldiers in both the active and reserve components. It is planned that FORECAST will also include DA civilian employees. Another dimension of the FORECAST system is its relevance to the personnel life-cycle management functions: accession, training, sustainment, distribution, and separation. The functional

areas to be supported by FORECAST and the levels of detail of its forecasts are depicted in Figure 2.1. The two components of FORECAST with which this project is concerned are the Total Active Army Level System (ELIM-COMPLIP) and the Enlisted MOS-Level System (MOSLS).

The first component of the FORECAST system to be developed, i.e., COMPLIP, became operational early in 1970 prior to cessation of hostilities in Vietnam. The objective in the development of COMPLIP was to have a more responsive and efficient means of determining draft calls, especially in a "what if" mode as alternative plans for operations in Vietnam came under review by officials in HQDA, OSD, and the White House. Thus, the initial orientation of the system was toward a wartime environment.

Development of the second major component of FORECAST, namely ELIM, was initiated in 1971 in response to enlisted manpower management problems relating to demobilization. The major focus of ELIM is the projection of enlisted losses and strength. ELIM-COMPLIP played an important role in the phasedown of Army strength after Vietnam and in the transition to an all-volunteer force in the mid-1970s time frame. During the past 12 years, the ELIM-COMPLIP system has undergone four major revisions to accommodate changing manpower issues and policies in a peacetime environment.

ELIM-COMPLIP is a system of programs and processes that is used by the Army to develop the official enlisted strength projections of the Army that are reflected in the "Active Army Military Manpower Program" (AAMMP). The projections contained in the AAMMP form the basis for development of the Program Objective Memorandum (POM); Five Year Defense Program (FYDP); The President's Budget; and time-phased, non-prior service accession requirements over a 7 year planning horizon.

While ELIM-COMPLIP was designed initially to deal with the manpower issues associated with the Vietnam war--e.g., the draft and several early release programs related to the terms of service and tour

rotation policies in effect at that time, no general mobilization capability has as yet been designed into the system.

The MOSLS is a computerized planning system that enables the Army to manage its enlisted force by MOS, grade, and, optionally, by years of service for periods extending several years into the future. The management functions supported by the MOSLS include initial entry training, promotion, reclassification, and year-group management. General Research Corporation completed development and demonstration of a prototype of the MOSLS in March 1981. An operational version of the system is currently being developed, with completion of a Phase I system scheduled for the end of November 1982 and a Phase II system 15 months later. One of the fundamental specifications for the MOSLS is that its projections be consistent in the aggregate with corresponding projections made by ELIM-COMPLIP. The demonstration of the prototype confirmed that this objective had been achieved. Another specification for the MOSLS is that it have a capability to deal with mobilization.

2.2 Objectives. The identification of modifications needed to use the FORECAST System as an aid to mobilization planners and for management of Army enlisted manpower during mobilization has as its major functional objectives the following:

- The employment of the ELIM-COMPLIP subsystems for management of the total enlisted force at and during mobilization and for management of each component (US Army Reserve, Army National Guard, etc.) of that force which has been mobilized.
- The utilization of the MOS Level System to manage the enlisted force by grade and military occupational specialty in support of personnel management functions, e.g., loss projections, training requirements.
- Identification of the degrees of flexibility and options that must be built into ELIM-COMPLIP, MOS Level System, and subsystem interfaces to accommodate enlisted manpower

management as the Army transitions from peacetime planning to wartime execution under a variety of mobilization manpower policies.

- Definition of data requirements for the FORECAST System in mobilization to include:
  - Identification of data sources.
  - Evaluation of data accuracy.
  - Specifications of data transfer processes.

2.2.1 Basic Design Considerations. The FORECAST System was developed to support Army strength and personnel functions in peacetime and under conditions of mobilization.

Throughout mobilization planning, and under conditions of mobilization, the FORECAST system must have the flexibility to forecast the effect of excursions and "what if" exercises.

- The system must respond to the impact of rapidly changing policies, constraints, and decisions without disturbing the capability to produce "best estimate" results under present conditions.
- The system must be able to make accurate forecasts of strength and management data during rapid changes in force structure and increased manning levels as the Army transitions from peace through several levels of mobilization. Conversely, the system must support the phasedown of the mobilization/wartime force structure and associated manpower strength and management activities.
- The FORECAST system must include in its projections, estimates of casualty losses and subsequent returns to duty.

2.2.2 Specific Design Requirements. The modifications identified as necessary for ELIM-COMPLIP and MOSLS to accommodate mobilization planning must provide:

- Time-phased training base output requirements by MOS for all levels of mobilization.
- Time-phased (10-day increments to at least 180 days) projections of trained manpower in all categories required for all levels of mobilization for the current year, the POM years, and the period of the FYDP, by grade and MOS[1].
- Determination of priorities for MOS training based on projected shortages and training duration required for the various MOSs.
- Projections of inductee calls required to achieve operating strength objectives.
- Handling of the phase-up and phase-down of strength in a common structure.
- Accounting of strengths of reservists who require Initial Entry Training.
- Specific accounting of projected strengths, gains, and losses for each category of manpower--Regular Army, Draftee, ARNG and USAR Selected Reserve, Individual Ready Reserve, Standby Reserve, Individual National Guard, and recalled retirees.
- The maintainability of strengths in a specific OCONUS zone for specified assignment eligibility constraints.
- Adaptability to a variety of mobilization policy scenarios. (See Appendix F for a review of the primary personnel policy parameters that would directly affect FORECAST.)

2.3 <u>Existing Methods and Procedures</u>. The current methods and procedures employed to produce the required manpower projections for all levels of mobilization in support of mobilization planning and the Wartime Manpower Program System (WARMAPS) include a variety of information sources and a variety of data manipulations.

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[1]Utilization of a Rapid Deployment Force. Since a Rapid Deployment Force is a particular unit its utilization will not be discussed in this FD. It should be addressed as a part of the Unit Level System of FORECAST.

2.3.1 Manpower Strength Projections.

2.3.1.1 Current Year, POM Years and FYDP. Procedures for making manpower projections for the current year, the POM years and the period of the FYDP for each of the categories shown below vary from category to category. Current sources of data and methods of calculating projections are as shown:

- Active Component. Manpower projections for the active component basically are derived from ELIM-COMPLIP which is produced monthly by ODCSPER.
- United States Army Reserve (USAR). The USAR manpower program, produced monthly, provides data for projections but not at the same level of detail as that provided by ELIM-COMPLIP. The system currently contains data on troop program units (TPU) or paid drill strength. It projects reserve strengths in peacetime; it does not now project strengths available for mobilization. It is planned to add information on full-time support personnel and Individual Mobilization Augmentees (IMA) during the next year.
- National Guard (NG). The National Guard Bureau produces a monthly NG manpower program. When required, ODCSPER obtains manpower strength projections directly from the National Guard Bureau.
- Individual Ready Reserve (IRR). The Reserve Components Personnel and Administration Center (RCPAC) provides data on the IRR to ODCSPER. ODCSPER then develops projections by adding appropriate gains/losses and making manual manipulations of the data.
- Standby Reserve. As in the case of the IRR, RCPAC provides the data to ODCSPER who then applies gain/loss information and develops projections by making manual manipulations of the data. The Standby Reserve is no longer considered a viable source of pretrained individual manpower; however, it remains a reserve category.

- Individual Mobilization Augmentees (IMA). Data for this category are obtained by ODCSPER from RCPAC.
- Inactive National Guard (ING). These data are contained in the ARNG manpower program which is produced on a monthly basis. As in the case of the regular ARNG projections, ODCSPER obtains the actual manpower strength projections, when required, directly from the National Guard Bureau.
- Retirees. Data on retirees are maintained by RCPAC. ODCSPER, or MPC using requirements based on mobilization tables of distribution and allowance (MOBTDA), then matches available resources with actual positions suitable for fill by retirees by skill and, where possible, by grade.
- Delayed Entry Program (DEP). Data on the number of participants in the DEP are collected by the US Army Recruiting Command and maintained by ODCSPER. Although the total number involved is small in comparison to other manpower pools, personnel in the DEP constitute yet another pool of available manpower upon mobilization and should be accounted for in the FORECAST System.

2.3.1.2 Extended Planning Annex (EPA). Manpower projections for the EPA are based on active component and reserve component force structure data which has been manually manipulated by ODCSPER in light of certain assumptions developed about future requirements.

2.3.1.3 Projections by Grade and MOS. In order to develop projections by grade and MOS level of detail, ODCSPER presently uses authorization documents, current strength data for the various pretrained manpower pools, and manual manipulations.

2.3.2 Training Requirements.

2.3.2.1 Training Base Output. Projections of training base output are developed by starting with the MOB PERSACS data base and applying the manpower strength in COMPO 1, 2, and 3 against it to get on-hand strength. Against this are applied such factors as THS, casualties,

losses to OCS, and reserve no-shows. Projected training gains are applied and then the data is run through the Personnel Inventory Analysis (PIA) model to convert MOS requirements into entry level MOS requirements. The various pools of trained individual reserve personnel (i.e., IRR, Standby Reserve, Retired Reserve, and Inactive National Guard) are then applied and the resulting shortfall is the postmobilization training base output requirement.

2.3.2.2 Skill Training Priorities. The development of priorities for skill training is currently a result of manual manipulation of data from the MILPERCEN 1322 Report (Quantitative and Qualitative Match of Army Full Mobilization Requirements with Assets of the IRR, Standby Reserve, and Other Potential Sources). Analysis of the 1322 Report helps determine shortages and long-lead time MOS training requirements. This information weighed against training base capacity and time-phased requirements leads toward development of skill training requirements.

2.3.3 Inductee Calls. Time-phased requirements for inductee calls are developed by using the postmobilization training base output report and the training base capacity (by skill and grade). Estimates of the numbers of inductees who will report to the various Military Enlistment Processing Stations, reception stations, training stations, and overseas replacement centers are based primarily on subjective evaluation of data from the training base output report. The current production version of ELIM-COMPLIP requires only a few changes to restore its original capability to contribute to this process by calculating levels of draft calls needed to meet aggregate trained strength targets.

2.3.4 Yield Rate Predictions. There are many factors which make the development of USAR and Army National Guard yield rate predictions difficult, at best. Army uses 90% for offices and bonus recipients and 70% for other. Across the board, this gives an approximate yield of 75%. Current OSD guidance reflects an Air Force yield rate of 75% for FY 83 through FY 87, and 90% for the Navy and the Marine Corps.

OSD(MRA&L) has previously considered raising all yield rates to 90%, but most recently indicates that even current service yield rates may be too high. Individual perceptions of the national resolve, sense of duty, and other situational factors which are difficult to measure during peacetime contribute to the overall difficulty of predicting yield rates.

2.3.5 IRR Inventory Objective. Development of the IRR Inventory Objective starts with the OSD established goals for all pretrained individual manpower pools. To this, the appropriately predetermined show/yield rate for the IRR is applied and the resulting shortfall is determined by manual manipulation of the available data.

2.3.6 Casualty Accounting. There are two aspects to the casualty accounting problem. The first is to incorporate the casualty projections used in mobilization planning scenarios into FORECAST. The second is to use FORECAST to generate accurate casualty projections in the event of an actual conflict. These two problems are similar in some respects, but different in others.

The first problem, incorporating casualty estimates from a mobilization planning scenario, has been studied in detail in a recent contract effort by ASM Associates and General Research Corporation (GRC). The results of this effort are summarized in the FORECAST Casualty-Loss Methodology Study Report (ASM Associates, Contract MDA903-80-C-0710, October 1981).

This study was a part of a larger Army Casualty Estimation Study (CES). The CES involves the US Army Concepts Analysis Agency (CAA), the Office of the Surgeon General (OTSG), ODCSPER, ODCSOPS, the Soldier Support Center (SSC), and the US Army Military Personnel Center (MILPERCEN). The first requirement for the ASM/GRC study effort was to understand and document the roles of these organizations in generating projections of casualties for a given mobilization scenario. The

second requirement for the ASM/GRC effort was to develop procedures for converting the outputs available from the Army CES into the categories and dimensions required for input to FORECAST. The third requirement was to develop specifications for how FORECAST would have to be changed internally to make use of this information. The results of this work are contained in the ASM/GRC study report referenced above. The current status of the work may be summarized as follows. With respect to all factors that have impact on FORECAST, the procedures used to generate the CES casualty estimates have been documented quite thoroughly.

A detailed methodology has been developed to convert the CES casualty estimates to categories required by ELIM-COMPLIP and by the MOSLS.

The recently published CES-Part I report (Dec. 81) prepared by the US Army Concepts Analysis Agency provides details on an improved and standardized methodology for theater level estimation for a conventional warfare scenario. Based upon information available in the CES-I report, the detailed methodology developed and described in the FORECAST Casualty-Loss Methodology Study Report will be modified to incorporate the formats of output data proposed in the CES-I report.

For ELIM-COMPLIP, only a relatively limited amount of conversion is needed. For example, total casualties must be divided into officer and enlisted, and into casualties who remain on the Army rolls (e.g., wounded) and those who do not (e.g., deaths, captured, missing in action). For casualties who remain on the Army rolls (e.g., soldiers in hospitals), it is necessary to project the time-phased schedule by which such soldiers either return to duty or are discharged from the Army. This is discussed further in Section 3.2.3. Also, the 10-day time periods used in mobilization planning must be aggregated to the 30-day periods used by ELIM-COMPLIP. In addition, the casualty numbers from the CES must be converted to casualty loss rates, because all ELIM-COMPLIP loss computations are based on rates. To compute casualty

loss rates, it is necessary to develop an estimate of the population at risk in each time period.

For the Enlisted MOS-Level System, there are much more significant conversion requirements. The main problem is to compute how the casualty losses and the population at risk are distributed by MOS and grade. At the time that the ASM/GRC study was being performed, the Army Casualty Estimation Study, Part I, was in process but not yet completed. The ASM/GRC study team was not able to determine the extent to which CES casualty estimates would be broken out by MOS and grade. Because of this situation, the ASM/GRC study report presents a detailed methodology for computing the required distributions by MOS and grade. For casualty losses, the distribution is based on an Army model called the Personnel Post Processor (PPP). In the ASM/GRC methodology, the distribution of the population at risk is based upon the personnel authorizations for one typical force in the theater of conflict. The CES Study Report[1] makes it clear that the Army CES methodology will provide a fairly detailed stratification of casualties and of the population at risk by MOS and grade. These breakouts by MOS and grade would be computed by the Casualty Stratification Model (CSM), as modified and run by CAA. The methodology described in the ASM/GRC report must clearly be modified to make use of these recently available breakouts.

The ASM/GRC report also contains fairly detailed discussion of how ELIM-COMPLIP and the MOSLS must be modified internally to make use of casualty loss factors. In the case of both ELIM-COMPLIP and MOSLS, some of the internal modifications will require a substantial amount of work.

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[1] Casualty Estimation Study - Part I (CES I), Study Report CAA-SR-81-21, Prepared by Force Analysis Directorate, US Army Concepts Analysis Agency, December 1981.

As mentioned at the start of this section, there are two aspects of casualty accounting. The first, incorporating into FORECAST the casualty projections from a mobilization planning scenario, has been addressed by the ASM/GRC study. The second aspect, using FORECAST to generate accurate casualty projections in an actual mobilization, has not received the same degree of study. There is, of course, substantial overlap between the two problems, but there are also some problems unique to an actual mobilization, and it is important that these problems receive adequate attention.

2.3.7 Summary of Problem Areas. The preceding sections have outlined the current methods and procedures employed to produce the required manpower projections for all levels of mobilization in support of mobilization planning. The major problem areas in current methods and procedures are outlined below:

- Computation of OSD Wartime Manpower Program System (WARMAPS) inputs is basically a manual manipulation of available data and requires considerable time.
- Development of USAR and Army National Guard yield rate predictions is extremely difficult primarily because of the difficulty in quantifying situational factors such as national resolve, individual sense of duty, pride, and the like.
- There is a need for incorporation of casualty projections used in mobilization planning scenarios into FORECAST and use of FORECAST to generate accurate casualty projections in the event of an actual conflict.

2.4 Proposed Methods and Procedures.

2.4.1 Summary of Improvements. The preceding sections have defined a series of requirements which the ELIM-COMPLIP and MOSLS portions of FORECAST must satisfy. In the following sections, these requirements

are restated in terms of the specific functional capabilities that will be added to these systems.

2.4.1.1 Strength Accounting by Personnel Class. In ELIM-COMPLIP additional vectors will be added to the total active Army enlisted strength, gain and loss arrays to provide specific accounting for USAR and ARNG Selected Reserves, IRR, ING, IMA, Recalled Retirees and Volunteer Veterans. These vectors will be defined by months of current active service.

Reserve accessions will be treated under two options. Under the first option, reserve total accessions by projection month will be an input to the Inventory Projection Module (IPM).[1] COMPLIP would then determine the enlistments and draft calls required to minimize deviations from the total enlisted mobilization operating strength. Under a second option the user would input the supply of reservists available for activation by projection month and COMPLIP would minimize the operating strength deviation by computing reserve, non-prior service volunteer, and draftee accessions, subject to user-supplied data on priorities and supply limitations on each of the sources.

Also in ELIM-COMPLIP, additional vectors will be made available to permit tracking of draftees by up to four characteristic group subsets, and the Matrix Generator will be extended to permit characteristic group constraints to be generated on draftees and NPS enlistees (separately, or in aggregate).

2.4.1.2 Strength Accounting By Months to ETS. Under some mobilization scenarios, contractual provisions for Expiration of Term of Service (ETS) will be nullified. This will be reflected in the ELIM-COMPLIP Rate Generator by setting the ETS (and reenlistment and extension) loss

[1] See also Section 3.3.1 for a discussion of the sources of such inputs.

rates to zero (a current user option). In the current IPM this will result in a growing strength in the last "Past-Due-ETS" cell. Demobilization planning will require a more accurate accounting of these strengths. Extending the month-to-ETS vectors from an end point at 7 months past ETS to an end point which is 7 months greater than the start of demobilization will provide a more accurate view of the status of the forces who were on active duty on M-day. For forces activated after M-day, accounting will be by month of service rather than months to ETS, and a similar extension of these vectors will also be required.

2.4.1.3 Combat Zone Strength and Loss Accounting.

2.4.1.3.1 Array Structures. For several reasons, including the nature of the CES casualty estimates, and concerns about the sustainability of the strength in the combat zone, separate accounting of combat zone strengths will be provided. The exact structure of this accounting will depend on the manpower mobilization policies in effect. In its most general manifestation, the strength in the combat zone will be represented by a three-dimensional array. One dimension will be personnel category, breaking the strength into Draftees, First Term Enlisted, Career Enlisted, Selected Reserve, and IRR. The second dimension will be Months of Deployment. If a fixed tour length is specified, the dimensions will be appropriate to that length. If an indefinite tour is specified this dimension will collapse. The third dimension will be months to ETS (or months of service, depending on the personnel category).

Generally speaking, this methodology can be extended to more than one "combat zone" or "overseas tour" area. However many such areas are specified, there will be required CONUS arrays whose dimensions would be personnel category and months to ETS (or months of service) so that transitions from CONUS to OCONUS can be made consistent with manpower policy constraints on assignment eligibility. While the theater forces are partitioned as above, the CONUS, or non-theater forces will be

partitioned by similar dimensions except that the month-to-expected-return-from-overseas dimension will be replaced by an eligibility-for-deployment dimension.

At each stage of the projection, the IPM will adjust the "area" arrays for gains and losses to the Army, will return eligibles from OCONUS to CONUS, and will send eligibles from CONUS to OCONUS to meet user-specified area strength targets. Projected PCS moves will be reported.

2.4.1.3.2 Casualty Accounting. Improved procedures for casualty accounting are very closely related to considerations of tour area strength and losses. Section 2.3.6 above, gives a fairly detailed description of the current status of casualty accounting procedures. This section discusses specific areas in which further work is needed. This section first considers casualty loss projections for use in mobilization planning scenarios, then special problems involved with an actual conflict.

The ASM/GRC FORECAST Casualty-Loss Methodology Study Report describes procedures by which casualty estimates from the Army CES can be incorporated into ELIM-COMPLIP and the MOSLS. This ASM/GRC project developed computer programs for converting Army CES casualty estimates into the dimensions and categories required by ELIM-COMPLIP and MOSLS. The project also developed specifications for the internal changes that are needed in ELIM-COMPLIP and MOSLS in order to make use of the converted casualty estimates. It was not within the scope of the ASM/GRC study to actually implement the internal changes needed in ELIM-COMPLIP and MOSLS. Making the required changes in ELIM-COMPLIP and MOSLS is a major step in improving the capability of FORECAST to deal with casualty estimates. The availability of CES-Part I information will assist in designing necessary modifications to existing computer programs and revising specifications mentioned above.

The methodology for breaking out aggregate casualty estimates into the categories required by ELIM-COMPLIP and MOSLS is described in detail in the ASM/GRC report. The most difficult part is to compute estimates of casualty loss rates by MOS and grade. The procedures for doing this require sophisticated computer programs, based on a system of full-screen interactive displays. All of these computer programs, although fully operational, will require modification in light of the CES-Part I report. Preparation of the inputs to these programs, however, requires a significant amount of analytic effort and manual computation. A significant improvement in the s[illegible] can be accomplished by improving this user interface. Section 3.[illegible] discusses this subject further.

In the case of actual mobilization, the casualty estimates computed by the Army CES methodology will be replaced by actual casualty data. During an actual mobilization, casualties will be reported through SIDPERS and reflected in the EMF. Under "wartime" conditions, as specified by the WARMAPS program, loss-type accounting will be terminated--casualties will not be separable from other losses in the personnel accounting system. If however, ELIM-COMPLIP maintains separate accounts for the forces in the theater of conflict, it should be possible to generate an approximation of casualty losses. Nearly all losses in the theater of conflict will be casualties, of one kind or another. Army losses outside the theater of conflict will of course not be casualties.

The detailed ASM/GRC procedures for breaking out casualties by MOS and grade will not be needed, because these breakouts will be available in the actual data. As each loss record is reported, it will be possible to determine the soldier's MOS and grade from the EMF. Some of the internal changes to FORECAST discussed in the ASM/GRC report will, however, continue to be important. In particular, it will be important for ELIM-COMPLIP to be able to maintain separate accounts for the forces in the theater of conflict and to apply casualty loss rates only to this part of the Army.

2.4.1.4 Improved ELIM-COMPLIP Problem Formulation. Because of the increase in user controls required to take full advantage of ELIM-COMPLIP's capabilities, a new Problem Formulator (under the Systems Management Module) is being developed. This subsystem will make maximum use of full screen displays and associated editing capabilities to guide the user through the decision-making process required to accomplish the complete setup and execution of ELIM-COMPLIP runs. Additional capabilities will have to be added to the Problem Formulator to account for the additional variations in policy parameters and alternative program options that a suitably flexible mobilization analysis capability will require.

2.4.1.5 Enhancements to MOSLS. As previously stated, MOSLS was designed with mobilization requirements as an objective. This FD defines no new requirements to be satisfied. It does, however, provide more precise guidance on some elements of the system design than was previously available. The effect of this additional guidance is reflected in later sections, especially Sections 3.2.1.2 and 3.2.5.

2.4.2 Summary of Impacts.

2.4.2.1 Equipment Impacts. The enhanced FORECAST system will operate on the current or planned FORECAST computer systems. No additional computer hardware will be required, except for four to six additional terminals (IBM3278/3279 type) to permit additional users to access the system and one additional IBM 3350 disk at USAMSSA to accommodate the large data files required.

2.4.2.2 Software Impacts. The enhancements defined will affect all the ELIM-COMPLIP modules. Primary impacts will be on the IPM, the Matrix Generator, and the Report Generator. Additional user-interface software, as discussed in 2.4.2.5, will be required for problem formulation, and for the structuring of user inputs.

Substantial modifications will also be required to some related computer systems that will provide input data to ELIM-COMPLIP and MOSLS. Most affected will be the Army Reserve Strength Projection system and the Army National Guard Strength Projection system (see also Section 3.3.1).

2.4.2.3 Organizational Impacts. No changes in organizational structures will be required by these enhancements. The need for additional personnel to operate the systems will depend on the extent to which FORECAST will be run in mobilization planning mode in parallel with ongoing production of operational manpower programs. One additional person will probably be added to the user tem for mobilization planning exercises.

2.4.2.4 Operational Impacts. The enhanced system will function under the control of the (modified) Systems Management Module. To the extent that it is run parallel to the existing system, additional CPU time and hardware resources will be needed.

2.4.2.4.1 Run Time and Space Requirements. Under many of the mobilization scenarios the CPU time and space requirements will be greater for the IPM in the enhanced system than is presently required. Impacts on other modules should be minimal. Changes in the design of the IPM already underway, however, are expected to significantly reduce the net impact on that module, relative to the size of the current production version.

2.4.2.5 Development Impacts. Development and testing will be conducted in parallel with operational use of the current systems and implementation of other enhancements already in progress. Data sets for one complete ELIM-COMPLIP run stream will be required for system level testing of these enhancements. No other significant impacts are anticipated during development.

SECTION 3. DETAILED CHARACTERISTICS

3.1 Specific Performance Requirements. The specific performance requirements for ELIM-COMPLIP and MOSLS are to:

- Provide time-phased projections of trained manpower by component, for all levels of mobilization, by grade and Military Occupational Specialty (MOS). A period of mobilization may be projected to occur at any time in the 7-year ELIM-COMPLIP planning period.
- Provide time-phased training base output requirements by MOS for all levels of mobilization.
- Determine priorities for skill training based on shortages and training duration required for the various MOS.
- Provide projections of inductee calls.

3.1.1 Accuracy and Validity. The ELIM-COMPLIP system has experience in making strength projections with 0.5% error rate out to at least 12 months. A goal of similar accuracy for mobilization planning is desired; however, under mobilization conditions uncertainties are greater (such as casualty projections versus actual casualties, etc.).

3.1.2 Timing.

- The timing requirement for updating the ELIM-COMPLIP/MOSLS data base normally will be monthly.
- Under exceptional, unusual or emergency conditions, the ELIM-COMPLIP/MOSLS data base can be created, restored or updated at any time, contingent upon computer time availability.
- The timing requirement for reconstituting the data base under normal conditions is overnight.
- Interactive query responses should be displayed on a CRT within 3 seconds of the query.

- Interactive query responses that require hardcopy may require up to 4 hours.
- The timing requirement for corrections processing under normal operation will be overnight.
- A complete run of ELIM/COMPLIP, after the data base has been updated, is required in 4 hours under normal conditions.
- A complete run of MOSLS, after data base update, must be accomplished overnight.

3.1.3 OSD WARMAPS Requirements. There are three major categories of WARMAPS requirements. They are the determination of (1) manpower requirements, (2) manpower demand, and (3) manpower supply. Manpower requirements determination includes force structure and nonstructure manpower requirements. Manpower demand determination includes force structure and nonstructure manpower demand. The determination of manpower supply involves identification of all sources of manpower available for duty on M-Day and later periods. Specifically, calculations include all of the following:

- Active Component units raised from peacetime strength to war required manning levels in a time-phased, incremental manner, consistent with required deployment and employment or projected workload.
- Reserve Component units mobilized on M-Day. Force structure requirements for each time period after pre-M-Day will reflect incremental increases for each unit to attain war-required manning levels, consistent with required deployment and employment or projected workload.
- Patient strengths, aeromedical evacuation workload, and casualty replacement requirements may be based upon projected casualties consistent with the specific scenario, the force structure requirements, and the prescribed theater evacuation policy.

3.1.4 Flexibility. There are many different kinds of mobilization, with great variations in personnel policies. The FORECAST systems (ELIM-COMPLIP and MOSLS) must be able to accommodate a variety of policy scenarios, including at least the following parameters to the extent described in Appendix F:

- Attrition loss management.
- ETS, immediate reenlistment and extension loss management.
- Enlistment policy, variations in term of enlistment, including indefinite enlistments.
- Combat zone assignments, including indefinite tours.
- Combat zone assignment eligibility constraints.

3.2 System Functions. The preceding sections have defined the functional requirements that ELIM-COMPLIP and MOSLS must meet to operate in a mobilization or mobilization planning environment. In the following subsections these requirements are translated into specific functional capabilities to be developed.

3.2.1 Requirements Met by the Current Systems.

3.2.1.1 ELIM-COMPLIP. Many of the requirements are already met by the existing system. These include:

- Modification of attrition, ETS, and reenlistment loss rates can be accomplished through a generalized capability that now exists in the Rate Generator.
- Strength accounting by characteristic group for draftees is under development in a separate contract. This effort also includes development of COMPLIP constraints on accessions by characteristic group jointly across enlistees and draftees.

3.2.1.2 MOSLS. Figure 3.1 is a very simple schematic representation of the design concept for the MOSLS, as it was presented to the System Advisory Group (SAG) for the contract that initiated the development cycle for the MOSLS and produced the Functional Description and System Specifications. The figure, which identifies those data inputs that are specific to operation in a "mobilization mode," is applicable also to the production version of the system--to distinguish the system that will be turned over to the Army for operational use from the prototype that was used by GRC to settle some detailed design issues and to demonstrate feasibility. The production version is currently under development, with development of a Phase I system scheduled to be completed by the end of November 1982 and a Phase II system 15 months later. (A period is scheduled to follow each development phase during which GRC will assist the Army in the initial use of the system.)

Internal to the MOSLS are the three modules shown in the center of Figure 3.1. The Preprocessor takes data from a variety of sources and puts it into the form needed by the rest of the system. The arrows go in both direction, indicating that data can be both input to and retrieved from this module. The Processor produces the forecast. The Postprocessor prepares management information needed by a variety of users. Wrapped around these is the System Management Module, which controls the operation of the system, as well as the input and output of data. Around the periphery are shown the major ways that the system interfaces with the outside world:

- AR 611-201 provides the definition of the structure of the enlisted force by CMF, MOS, and grade.
- A data base is constructed from the Enlisted Master File (EMF) and the Gain/Loss Transaction File (GLF), which are provided by MILPERCEN. This data base, which is shared with ELIM-COMPLIP, is updated monthly.
- Another major source of data is the Structure and Composition System (SACS)--or more specifically, Personnel SACS (PERSACS). The file of authorizations data will be

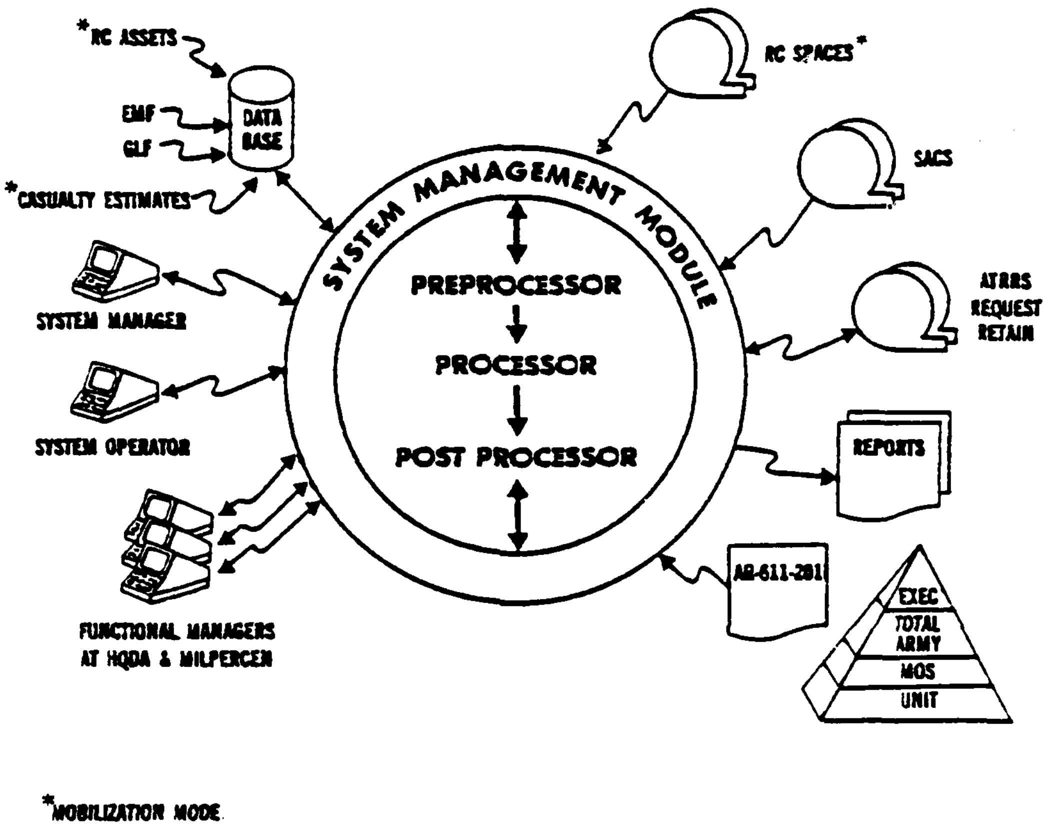

Figure 3.1. FORECAST System - MOS Level

updated each time a new PERSACS is produced. The authorizations, aggregated by MOS and grade, are time-phased, corresponding to the current force structure and that projected for the period covered by the forecast. The PAM will have the capability to modify the data derived from the official PERSACS in order to generate data corresponding to notional forces with specifications input by a designated user.

- Other automated files are shown coming from Army Training Requirement and Resources System (ATRRS), REQUEST, and RETAIN. Data will also be provided by FORECAST to these three systems.
- A number of people will interact with the system via terminals. The System Manager will be responsible for its overall operation and maintenance. The System Operator will be responsible for the set-up and execution of alternatives that have been approved for running by the System Manager. Functional personnel managers at HQDA and MILPERCEN will have access to FORECAST for data retrieval and analysis, input of data, and exercise of specified controls over the system.
- When the system operates in a mobilization mode, additional data are needed. Authorizations must be provided for USAR and ARNG units that are or will be activated. The data base must be augmented with data on RC personnel that are already activated or that are projected to be available for activation. There must also be estimates of casualties and subsequent returns to duty by the level of detail prescribed for the forecast. All of these data must, of course, correspond to the specific mobilization situation existing and/or being projected at the time the forecast is made.

Figure 3.2 depicts the integration of the MOSLS with ELIM-COMPLIP, where the data shared and exchanged by the two systems ensures that the forecasts made at the two levels of detail are consistent.

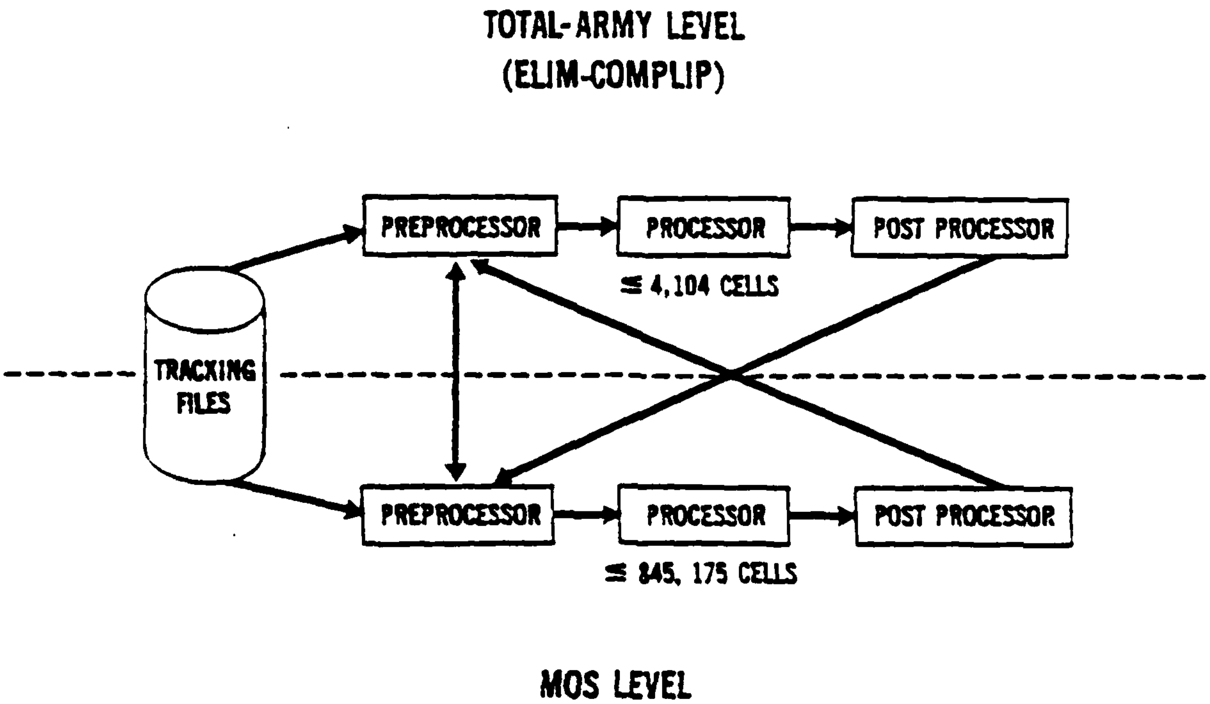

Figure 3.2. Integration of the Total Army Level and MOS Level Components of FORECAST

Table 3.1 lists specifications for four types of projection models that are included in the Processor of the MOSLS. The first two and last two model types, respectively, constitute two families of models. The principal distinction between the two is the inclusion of the year-of-service (YOS) dimension in the latter. Each of the model families represents and will provide management data for the functions of promotion, reclassification, reenlistment, accession, and attrition. The first also deals with initial entry training, while the second deals with objective-force or year-group management. The first family of models will definitely have a mobilization capability. The second can, if desired. It appears that concern for year-group management will have progressively lower priority as the level of mobilization increases.

Within each of the families of models listed in Table 3.1 there are two types of model, the second operating at the MOS level of detail and the first dealing with groups of MOSs. For the YOS models the grouping is by career management field (CMF), while for the other family there is a grouping within each CMF by "training time groups" (TTGs)--i.e., groups of MOSs with approximately equal course lengths for advanced individual training (AIT) leading to MOS-award--or, for certain MOSs, one station unit training (OSUT) minus the equivalent time for basic training. The more aggregate models cover the entire planning horizon, with the maximum time spans listed in the table. The more detailed models, covering only one period at a time, break out the projections of the aggregate models to the MOS level of detail. The reason for this approach is to prevent model size from exceeding the feasible limit for the use of optimization procedures.

The use of optimization procedures makes it possible to provide data designed to meet information needs that are formulated in the most natural way. For example, the system will determine the requirements for initial entry training in order to provide the best possible fit between the projected number of people and the desired level in each MOS and grade, where all relevant policies--e.g., with respect to reclassifications, promotions, and reenlistments--are specified.

TABLE 3.1

PROJECTION MODEL SPECIFICATIONS

MODEL	BREAKOUTS	TIME SPAN	NUMBER OF PERIODS	SIZE OF PERIODS	FUNCTIONS	MOBILIZATION?
All TTG*	CMF/TTG* Grade	6-7 FYs	Approx 12	Variable: Quarterly To Annual	Training Promotion	YES
					Reclassification	
All MOS	MOS Grade				Reenlistment	
					Accession	
					Attrition	
All CMF-YOS	CMF	5 FYs	5	Annual	Objective Force Mgt.	If Desired
	Grade				Promotion	
	YOS				Reclassification	
One CMF-YOS	MOS				Reenlistment	
	Grade				Accession	
	YOS				Attrition	

*Training Time Groups--Groups of MOSs with Approximately Equal AIT Time

As indicated in Table 3.1, the time periods used in the MOSLS projection models range in length from quarters to years. ELIM-COMPLIP, on the other hand, currently uses monthly periods through the 6 to 7 FYs covered by the AAMMP. Because projections of the MOSLS are constrained to be consistent with those of ELIM-COMPLIP, it is possible for the MOSLS Postprocessor to use interpolation to break the MOSLS projections out by the periods used in ELIM-COMPLIP.

3.2.2 ELIM-COMPLIP Problem Formulator. As the FORECAST system has become more complex, it has become more and more important to provide automated assistance to the analysts who operate the system. One significant step in this direction has been development of a System Management Module, based upon the APEX software, to control the process of submitting complex sequences of dependent jobs. Another step has been the use of full-screen interactive displays as a means for the entry of user decisions and data. The next logical step, currently being initiated under another contract, is the use of such a full-screen display capability to assist the user in problem formulation.

The addition of mobilization options to FORECAST represents a significant increase in the complexity of the system. This will necessitate an increase in the number of user decisions required to specify a run, and an increase in the quantity of data that the user must supply to the system. Moreover, under mobilization conditions, the system operators will be under severe pressure to make a large number of accurate runs in the shortest possible time. Under these circumstances, it will be crucial to have the most efficient possible procedures for user interaction with the system.

A system of full-screen interactive displays has proven to be a very efficient tool for entry of user decisions and data. This tool is being used in key parts of FORECAST, but its use can be significantly expanded. Such an improvement of the user interface mechanism is an essential part of improving the capabilities of FORECAST in a mobilization environment.

In many ways this will be an upgrade, modernization, and automation of the present ELIM-COMPLIP Runbook (Volume 13 of the system documentation).

3.2.3 Casualty Estimation Interface. For mobilization planning, aggregate casualty estimates will be supplied by the Army CES-I methodology. These aggregate casualty estimates must be converted to the categories needed by ELIM-COMPLIP and MOSLS. It will also be necessary to make some internal changes to ELIM-COMPLIP and MOSLS to make use of the casualty information.

The requirements for preliminary conversions of the casualty estimates for ELIM-COMPLIP are fairly limited. It is necessary to separate total casualties into officer and enlisted, and to aggregate from the 10-day time periods used in mobilization planning to the monthly time periods used in ELIM-COMPLIP. The ASM/GRC FORECAST Casualty-Loss Methodology Study Report, previously discussed in Section 2.3.6, contains specifications for making these conversions. Modifications and enhancements made possible by the CES-I methodology will be incorporated in making these conversions.

It is also necessary to separate casualties into those who are immediate losses to the Army (e.g., deaths, captured/missing in action) and those who remain on the Army rolls (e.g., wounded, disease/non-battle injuries).

In general, casualties due to wounds, disease, and non-battle injuries become Holdees. The size of the transient/holdee/student (THS) account has an important effect on the computations of COMPLIP. Hence procedures for accounting for wounded, sick, and injured soldiers are very important. The FORECAST Casualty-Loss Methodology Study Report discusses this problem in detail. The Patient Flow Model, operated for the Office of the Surgeon General, is the most important source of information. This model projects admissions to hospitals in the theater of conflict, returns to duty from these hospitals, and

evacuations to the Continental United States (CONUS). Soldiers evacuated to CONUS will receive further hospital treatment, and will ultimately either be returned to active duty or discharged from the Army.

The Army CES casualty estimates focus on losses to operating strength in the theater. For input to ELIM-COMPLIP, the losses to theater operating strength must be divided into two categories, namely additions to the THS account (soldiers in hospitals) and losses to the Army. Of course, soldiers in the THS account may become losses to the Army (e.g., disability retirements) at some later time. The appropriate time flow pattern must be incorporated into the casualty estimates input to ELIM-COMPLIP.

As already mentioned, it will be necessary to make some changes in the internal ELIM-COMPLIP software to make use of casualty estimates. The needed changes are discussed in considerable detail in the FORECAST Casualty-Loss Methodology Study Report (pp. 3-11 to 3-22). These changes to ELIM-COMPLIP must be considered as part of the full set of modifications needed to improve ELIM-COMPLIP as a tool for mobilization planning.

MOSLS needs casualty estimates broken out by MOS and grade. The ASM/GRC study report presents a detailed methodology for accomplishing this breakout. As discussed previously (Section 2.3.6), this methodology must be modified somewhat to make use of the breakout of casualties by MOS and grade computed by the Casualty Stratification Model (CSM).

In a peacetime mode of operation the MOSLS rate generator computes unnormalized loss rates by MOS and grade from historical loss and strength data obtained from the GLF and EMF. These rates are then normalized to ensure that the MOSLS loss projections agree in aggregate with those made by ELIM. When operating in mobilization mode the MOSLS will receive monthly loss counts by MOS, grade and type of loss for the

population at risk from the FORECAST casualty loss module. Interface routines must be written to enable the MOSLS to receive these data. Also new loss rate generation procedures and related software must be developed to augment the peacetime rate generator. These procedures must be capable of integrating the data for the theater population coming from the casualty loss module with the historical data coming from the EMF and GLF. Also they must be capable of developing loss rates that account for the different loss patterns in the portion of the Army exposed to hostilities and the portion that is free from threat.

The ASM/GRC report uses a distribution by MOS and grade based upon a typical theater force, constructed to demonstrate the methodology of the report. This represented the best information available to the study effort. Analytic effort was, of course, necessary to structure this typical theater force. Once the force structure was decided, TOE authorizations documents were obtained in microfiche form, and the needed distributions by MOS and grade were calculated. This procedure yielded a satisfactory demonstration of the methodology. For an operational system, however, it would be much better to have an automated procedure for computing MOS and grade distributions from automated data sources for the units selected to be in the theater. Access to the FORECAST Personnel Authorizations Module (PAM), currently under development, should satisfy this requirement.

When actual casualty data are available, different procedures will be required. For ELIM-COMPLIP, the first requirement is to determine how many soldiers are in the theater of conflict, and how these soldiers are distributed over the ELIM population dimensions. If the list of units in the theater is available, and if Unit Identification Code (UIC) is added to the ELIM Enlisted Master File (EMF) extract, then the required distributions for the current month can be readily computed. As the projection moves into future months, it will be necessary to develop approximation rules for the distribution of gains

to the theater force. Losses to the theater force will be computed by applying loss rates. These rates should probably be uniform with respect to the ELIM population dimensions. The loss rates will be computed from historical data, and will be subject to user modification, like all other ELIM rates. The user controls already available in the ELIM Rate/Factor Generator should be sufficient to meet requirements.

The MOSLS will be constrained to match the total losses computed by ELIM-COMPLIP. In the early stages of an actual conflict, the distribution of casualties by MOS and grade will be computed in the same way as for a mobilization planning scenario. As the conflict proceeds and more actual data become available, the projection will be modified to incorporate the distribution shown in the actual data. This transition will require careful analysis by the user team.

3.2.4 Modifications to Existing ELIM-COMPLIP. The requirements defined previously will have substantial impacts on the structure of some of the ELIM-COMPLIP modules. Some modifications will be required in the Data Processor and Rate Generator Modules; major changes will be required in the Inventory Projection Module; and significant changes will be required in the Matrix Generator and the Report Generator.

3.2.4.1 Modifications to the Inventory Projection Module. Changes in the IPM will be of two basic types--those required to accommodate new information requirements and those required to provide the flexibility needed for evaluation of a spectrum of mobilization manpower policy alternatives. The first type of changes will include:

- Strength projection of reservists by type (Selected Reserve and National Guard, ING, IRR, IMA, Volunteer Veterans, Recalled Retirees).
- Strength projection by tour area or theater by months to ETS (or months of service, depending on category), months of deployment, and major personnel category.

- Strength projections for non-theater forces by personnel category, months to ETS (or months of service) and deployability status.
- Incorporation of casualty estimates in both total Army and Combat Area strength projections.
- Expansion of all arrays with a "months to ETS" dimension to permit strength to be "past due ETS" up to at least 31 months instead of the current 7 month limit.

3.2.4.2 Modifications to the Matrix Generator. The Matrix Generator will be enhanced to permit specifications of constraints on the monthly supply of reservists of the specified kinds and the input of preference constraints on the various categories of accessions. When reserve activation schedules are fixed they would be input to the IPM; changes to the Matrix Generator would be required to account for these reserve strengths.

3.2.4.3 Modifications to the Report Generator. The Report Generator will be modified to account for the reservist strengths, gains, and losses by reserve category. The Report Generator will also be modified to produce manpower programs for projection time intervals other than the standard monthly interval. For example, the Report Generator will have a capability to generate projections at 10-day intervals. This will be accomplished as follows:

- Fixed gains by time period input to the IPM will be read by the Report Generator.
- Casualty estimates by time period will be read by the Report Generator.
- Other losses and gains determined by COMPLIP will be assumed to occur uniformly over the month and will be allocated to the required time interval appropriately.

3.2.4.4. Other ELIM-COMPLIP Modifications. The Data Processor Module will be modified (as will the relevant output data files) to account explicitly for gains and losses of reservists by reserve category and to account for area of assignment and deployability factors for all personnel categories. The Rate Generator will also be modified to permit projection of loss rates for reservists. In these modules, reserve strengths will be by months of active current service. These can be converted in the IPM to months to ETS if a fixed obligation exists.

In addition, changes will be made to the design of the DEP Flow Model to permit user-controlled "telescoping" of the DEP inventory which, in peacetime, is classified by anticipated future accession month.

3.2.5 Modifications to MOSLS Software. As indicated in Section 3.2.1.2, the design concept for the MOSLS has from the beginning provided for the capability to operate in a "mobilization mode." However, availability of detailed specifications for this capability has awaited the results of this project. Following is a discussion of these specifications for each of the major components of the MOSLS identified in Section 3.2.1.2--i.e., the Preprocessor, Processor, and Postprocessor.

3.2.5.1 Preprocessor. The Preprocessor will have to be able to deal with the following new types of data: authorizations for RC units, RC assets, and casualties. Each of these is discussed in the following subsections.

3.2.5.1.1 RC Authorizations. The MOSLS must have the number of spaces by MOS and grade authorized for every RC unit that is already, or projected to be, activated. The time schedule for activation must also be specified. It is assumed that these data will be provided to the MOSLS either by means of a mobilization version of PERSACS or by means

of the capability being provided by the Personnel Authorizations Module (PAM) for the user to specify modifications to PERSACS to account for projected (including "what if") force structure changes.

The Authorizations Creation Subsystem (ACS) of the PAM is designed to process the peacetime PERSACS and produce an authorizations extract in a format usable by the MOSLS. A similar subsystem will have to be developed to process the mobilization version of PERSACS both to create an authorizations extract and an activation schedule for RC MOSs. This subsystem would replace the peacetime ACS under conditions of mobilization or if the MOSLS were being run to plan for such an event.

For mobilization planning MOSLS users would also have at their disposal the PAM capabilities to input notional modifications to PERSACS. A capability would however have to be developed to enter interactively the activation schedule for any RC MOSs being activated.

There is another type of data in the MOSLS that must be consistent with both authorizations and assets. This is a file containing information derived from AR 611-201 concerning the MOSs and corresponding grade ranges that are valid, as well as the career progression paths connecting the various MOS-grade pairs in each CMF. Provision has been made to include in the referenced file those MOSs that are specified in AR 611-201 as Reserve MOSs, with an identifying flag. Provision is also being made for user inputs to this file, which could be required in case authorizations should be provided for MOS-grade pairs that are not included in the most recent edition of AR 611-201.

A related requirement is for the projection models to be provided with information concerning the time period(s) when the MOSs for RC units are to be added to the models, where this corresponds to the period(s) when the corresponding units are to be activated. The simplest way for this information to be provided is to have the Reserve MOSs, with the time period of activation, entered into a file in the MOSLS data base that is used for the peacetime mode to specify additions of new MOSs that are associated with MOS conversions.

3.2.5.1.2 RC Assets. Once RC personnel come into the active Army, their records are expected to be on the EMF. Those records will be processed by the MOSLS and incorporated in the data base in exactly the same way that records for Regular Army personnel are handled in the peacetime mode. There will, however, have to be a policy parameter by which the user directs that RC personnel records be processed, since in the peacetime mode records corresponding to USAR and NG personnel are not processed.

When the MOSLS is to deal with mobilization projected to occur in the future or with incremental call-up of RC personnel with some occurring in future periods, a projection of available RC assets will be needed. This requirement is discussed in Section 3.3.1. Software will have to be developed to process these assets and insert them into the appropriate MOS and grade nodes in the MOSLS projection models.

3.2.5.1.3 Casualties. Section 3.3.2 discusses the requirements for and source of data for projecting casualties and subsequent returns to duty. For the mobilization mode the MOSLS rate generator will require a capability to project casualties based on the estimates discussed in the referenced section.

3.2.5.2 Processor. It is not currently feasible that the size of the MOSLS projection models be increased enough to provide a breakout by component. Hence, it is not anticipated that operation in the mobilization mode will have any significant impact on the Processor Module other than the requirement to ensure that the Problem Formulator can handle all of the types of data discussed in the preceding subsection.

3.2.5.3 Postprocessor. The major impact of mobilization on the Postprocessor will be the breakouts of (a) loss projections to show the additional category of casualties, (b) gain projections to show RC personnel coming on active duty and returns to duty of WIAs and MIAs, and (c) projections for the shorter (ELIM-COMPLIP) time periods. If

it should be deemed necessary for the MOSLS projections to be broken out by component, this breakout will be accomplished in the Post-processor using data from ELIM-COMPLIP to assist in this process.

3.3 New or Modified Inputs and Outputs. The new capabilities defined in the preceding sections require data from sources outside ELIM-COMPLIP and MOSLS.

3.3.1 Strength Projections for Reserve Components. In order to provide proper accounting for reserve strengths, the systems will project reserve strengths by category (ARNG and USAR Selected Reserve, IRR, ING, Volunteer Veterans, Recalled Retirees) available for activation at an arbitrary future time, adjusted by approved yield rates, and consistent with an activation schedule reflected in an appropriately modified, time-phased authorizations data base (see also 3.3.3). These projections will also have to provide estimates of the fraction of those activated who will require basic combat and advanced individual training prior to deployment. The projected activations must be identified by grade and MOS.

No system currently exists with these capabilities. Two reserve projection systems have been implemented to project peacetime strengths of some subsets of the components defined above--ARMPRO, which the Army uses to projected USAR TPU strengths; and PERCS, used by both OSD and the Navy to project total reserve strengths. PERCS has had several years of operational experience; ARMPRO is now in its first year of production use.

Since no system exists to meet these requirements, consideration must be given to interim means of providing ELIM-COMPLIP and MOSLS with the RC strength projections. This can be accomplished by developing and maintaining a special data base of current RC assets, taken from the MOBPERS data base. These current assets could then be used as estimates of future strengths and, with the application of an approved yield rate methodology, provide activated strength estimates for mobilization planning studies.

3.3.2 Casualty Estimates. For mobilization planning, the estimates of total casualties will be generated by the Army CES-I methodology. Three classes of casualty losses will be calculated: (1) Battle Casualties include Killed in Action (KIA), Captured or Missing in Action (CMIA), Wounded in Action (WIA), Died in the Hospital (DIED), Returned to Duty from the Hospital (RTD), and Evacuated from the Theater (EVAC); (2) Non-Battle Casualties include Disease and Non-Battle Injuries (DNBI), Returned to Duty from the Hospital (RTD), Died in the Hospital (DIED), and Evacuated from the Theater (EVAC); (3) Administrative Losses (ADMIN) include Absent Without Official Leave (AWOL), Desertion (DESERT), Confinement (CONF), and Missing-Not in Action (MISS). WIA and DNBI casualties and some ADMIN losses are not losses to the Army, but rather transfers from operating strength to the Holdee category, part of the Transient, Holdee, and Student (THS) account.

The methodology developed in the ASM/GRC FORECAST Casualty-Loss Methodology Study as modified to be compatible with the CES-I methodology will be used to disaggregate casualties into the categories needed for input to ELIM-COMPLIP and MOSLS. Note that it is necessary for the population at risk to be disaggregated into the same categories as the casualty losses, so that casualty loss rates may be computed. (The basic procedure for computing losses in FORECAST is to apply loss rates to the appropriate population.) Note also that data are required on returns to duty of soldiers in hospitals, as discussed previously in Section 3.3.2.

For casualty losses, the population at risk is not the whole Army, but rather the Army forces in the theater of conflict. For MOSLS the theater forces must be disaggregated by MOS and Grade; for ELIM-COMPLIP, theater forces must be disaggregated by the ELIM population dimensions. As discussed in previous sections, the inputs available to the ASM/GRC FORECAST Casualty-Loss Methodology Study was based on the best information available at the time of preparation relative to the degree of detailed information available.

Next consider the problems of generating casualty estimates in an actual conflict. In this case, casualty data will be reported through SIDPERS to the EMF. As previously mentioned, under wartime conditions (as specified by WARMAPS program) loss type codes may not be reported with loss transactions. It will be a fairly good approximation, however, to assume that all losses in the theater of conflict represent some type of casualties.

In the very early stages of the conflict, it may be advisable to base casualty projections on factors from a relevant CES scenario. As actual data become available, these actuals should become the basis for future projections.

3.3.3 <u>Time-Phased Strength Targets</u>. As an adjunct to the development of the production version of the MOSLS, a Personnel Authorization Module (PAM) is being designed to have broad applicability across a spectrum of FORECAST authorizations data requirements. Initial design specifications for PAM call for exclusion of RC units. This exclusion must be deleted so that PAM can be used for mobilization strength planning and management in ELIM-COMPLIP, MOSLS, and the reserve projection and casualty estimation systems referred to in Sections 3.3.1 and 3.3.2.

3.4 <u>Data Characteristics</u>. Detailed specifications of data requirements are provided in the *Data Requirements Document* (RD) which is Tab 3 of this report.

3.5 <u>Failure Contingencies</u>. Failure recovery and restart procedures will follow the standard processes used now for the current versions of ELIM-COMPLIP and MOSLS.

SECTION 4. ENVIRONMENT

4.1 Equipment Environment. The enhanced ELIM-COMPLIP and MOSL systems will operate on the same computer systems as the peacetime production versions. In general, they will require the equivalent of USAMSSA's IBM 3033 and the FORECAST system's IBM 4331 (with programmed enhancements). Specification of additional storage media and telecommunications capacities must await further refinement of the FORECAST computer system capabilities.

These systems should also be able to run on the computer systems at the Alternate Sites. Versions of these systems, with capabilities consistent with the mobilization environment under which Alternate Sites would be activated, should be developed.

4.2 Support Software Environment. The software support currently used for FORECAST will be adequate for use with the mobilization enhancements to be implemented on the primary computer systems. Maintenance of the enhanced systems will be the responsibility of the FORECAST Project Office.

4.3 Interfaces. All systems with which interfaces will be required are part of (or are planned to be part of), or currently interface with, elements of the FORECAST system with one exception. Until such time as a suitable reserve component strength projection system is made available as defined in Section 3.1.1, FORECAST will require quarterly extracts from the MOBPERS data base at USA MILPERCEN and the RCPAC Data Base. The specific content of the required extracts will be provided in the RD.

4.4 Security and Privacy. Development of these enhancements can continue in an unclassified environment. Final system tests and ultimate operational use will probably require secure facilities because of the classified nature of reserve component activation schedules and of Army

strength capabilities in mobilization conditions. This implies that most, if not all, user interaction with these systems will have to be through secure communication links to a computer system approved for classified processing.

SECTION 5. COST FACTORS

The preceding sections have defined a series of enhancements to be made to ELIM-COMPLIP and the MOSLS. Two kinds of costs will be incurred in the development and implementation of these systems: development costs and operational costs. The accuracy of the cost factor estimates that follow will depend on decisions by the Army concerning the computer systems to be used, and on the extent that the enhanced systems will be used for mobilization planning exercises, concurrent with normal use of the existing peacetime systems.

5.1 Development Costs.

5.1.1 ELIM-COMPLIP. Design, development and implementation of these changes is estimated to require approximately 80 technical person months (tpm) of professional effort. Major elements will include:

- Changes to the ELIM-COMPLIP Data Processor Module, including an interim Reserve Component Inventory submodule-13 tpm.
- Changes to the ELIM-COMPLIP Rate Generator Module-3 tpm.
- Changes to the ELIM-COMPLIP Inventory Projection Module-20 tpm.
- Changes to the ELIM-COMPLIP Matrix Generator-4 tpm.
- Changes to the ELIM-COMPLIP Report Generator Module-8 tpm.
- Completion of the casualty estimation subsystem and interface with ELIM-COMPLIP-13 tpm.
- Changes to the Systems Management Module for ELIM-COMPLIP-7 tpm.
- System testing of enhancements-10 tpm.

In addition to these professional requirements, one additional IBM 3370 disk on the FORECAST IBM 4300 will be required for development and testing.

The cost of this development effort, including the costs of additional terminals and disks is estimated to be $550,000.

5.1.2 MOS Level System and Personnel Authorizations Module. Design, development, and implementation of the previously discussed changes to MOSLS and PAM are estimated to require approximately 26 technical person months (tpm) of professional effort. Major change elements to MOSLS and PAM include:

- Changes to the FORECAST Personnel Authorizations Module (PAM) including new versions of the Authorization Creation Subsystem and the MOSLS Target Generator-10 tpm.
- Changes to MOSLS resulting from the introduction of casualty loss data including development of a new interface procedure and a new Rate Generator Module-10 tpm.
- Changes to MOSLS resulting from the introduction of Reserve Component data requiring a new module within the Data Base Subsystem and modifications to the Preprocessor, Processor, and Postprocessor Modules-6 tpm.

The cost of this development effort, including the cost of additional terminals is estimated to be $225,000.

5.2 Operational Costs.

5.2.1 ELIM-COMPLIP. The cost of operating the enhanced systems will depend largely on the frequency of use, and the extent to which they will be run concurrently with the existing, peacetime system. Because of the additional data inputs to these systems under mobilization, and because of the probable need to run them concurrently with the peacetime system, one additional IBM 3350 disk equivalent will be needed. CPU requirements will vary with frequency of use, but on a per-run basis, would be expected to be about 3-5 CPU minutes greater than the peacetime system.[1] In addition, the operation of new elements in the Data Processor module will add about 8-10 CPU minutes per monthly update.

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[1]Under some mobilization scenarios, the run time would probably be shorter than for the peacetime system because of a reduction in the number of dimensions of the arrays used by various modules in the system.

Operational manpower costs will also depend on the frequency of use. For planning purposes, it may be assumed that the models will be run concurrently with the existing systems, and that one additional professional staff member will be added to the user team to accommodate these additional demands.

5.2.2 MOS Level System. As with ELIM-COMPLIP, the cost of operating the enhanced systems will depend largely on the frequency of use for mobilization planning and the extent to which the mobilization version will be run concurrently with the peacetime system.

While there will be some increase in mass storage requirement and execution times of the various subsystems and modules resulting from the introduction of Reserve Component data and a mobilization PERSACS file, the increases are expected to be insignificant--certainly not requiring additional computer facilities.

Operational manpower costs should not be affected unless, as previously stated, the mobilization and peacetime runs are executed nearly simultaneously or in rapid succession. The assumption is that mobilization planning runs will be infrequent in comparison to normal production runs of the system.

SECTION 6. SYSTEMS MODIFICATION PLAN

6.1 ELIM-COMPLIP. Some of the tasks for the enhancement of ELIM-COMPLIP should be undertaken in Phase II of the contract under which this FD is written. These tasks would include:

- Completion of the Casualty Estimation Subsystem.
- Development of the interim interface with MOBPERS.
- Writing of System Change Requests (SCRs) for the changes to existing ELIM-COMPLIP software, including the Systems Management Module.

Implementation of changes defined by the SCRs would occur under other maintenance and enhancement contracts. Such modifications could be completed in 9 to 12 calendar months, including time for systems testing and updating of the systems documentation. Some additional time would be required in the future for full integration of the reserve component strength projection systems defined in Section 3.3, and to accommodate new strength data bases that are currently in their early development stages at MILPERCEN.

6.2 MOS Level FORECAST. The changes to MOS Level FORECAST necessary to provide the require mobilization capabilities could be undertaken either as an addition to Phase II of the existing contract or through a contract modification. All changes described in this FD could be implemented within 9 to 12 calendar months including systems testing and appropriate documentation.

Tab 2

System Specifications: Modifications To ELIM-COMPLIP and MOSLS for Mobilization Strength Planning and Management For Enlisted Personnel

By:

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May 1982

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SYSTEM SPECIFICATIONS
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SECTION 1. GENERAL

1.1 Purpose of the System Specifications. This System Specification (SS) for "Mobilization Planning Using FORECAST," Contract Number MDA 903-81-C-0649, 29 September 1981, is written to fulfill the following objectives:

- To describe the detailed specifications of modifications to the ELIM-COMPLIP[1] and MOS Level[2] Systems of FORECAST so that they can be used as an enlisted resource management system under conditions of simulated or actual mobilization.
- To define interfaces with other systems.
- To provide a basis for the development of the system tests.

1.2 Project References. The references used during development of this system specification are listed at Appendix C.

The sponsoring office for this project is the FORECAST Project Office [OASA(M&RA)]. The Project Manager is Colonel E. R. Guthrie. The Contracting Officer's Technical Representative (COTR) is LTC James L. Jandreau.

Users of the products will be manpower resource managers at Headquarters, Department of the Army (HQDA), United States Army Military Personnel Center (MILPERCEN), Major Commands and Field Operating Agencies. Functional areas supported will include planning, programming, and budgeting; policy development; force development; and accessioning, training, accounting for and distribution of the enlisted force during simulated or actual mobilization.

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[1] ELIM is an acronym for Enlisted Loss Inventory Model; COMPLIP is an acronym for COmputation of Manpower Programs using LInear Programming. ELIM-COMPLIP is also called the Total Active Army Level System of FORECAST.

[2] A prototype version of MOSLS has been demonstrated, and a Phase I production version is scheduled to be operational by November 1982.

The ADP and Telecommunications support will be provided by the United States Army Management Systems Support Agency (USAMSSA).

1.3 Terms, Abbreviations, and Acronyms. The definition of terms, abbreviations, and acronyms used in this document may be found in Appendix D.

SECTION 2. SUMMARY OF REQUIREMENTS

2.1 System Description. FORECAST is an integrated family of ADP systems that will support Army strength and personnel management data forecasting requirements in peacetime and under conditions of mobilization. Types of personnel included in the forecasts are officers and enlisted soldiers in both the active and reserve components. It is planned that FORECAST will also include DA civilian employees. Another dimension of the FORECAST system is its relevance to the personnel life-cycle management functions: accession, training, sustainment, distribution, and separation. The functional areas to be supported by FORECAST and the levels of detail of its forecasts were depicted in Figure 2.1 of Tab 1.

This SS describes the modifications required to two major components of the FORECAST system that are currently operational so that they can be used as an enlisted resource management system under conditions of simulated or actual mobilization. They are ELIM-COMPLIP and the enlisted Military Occupational Speciality (MOS) Level System (MOSLS).

ELIM-COMPLIP is a system of programs and processes that is used by the Army to develop the official enlisted strength projections of the Army that are reflected in the "Active Army Military Manpower Program" (AAMMP). The projections contained in the AAMMP form the basis for development of the Program Objective Memorandum (POM); Five Year Defense Program (FYDP); The President's Budget; and time-phased, non-prior service accession requirements over a 7-year planning horizon.

The MOSLS is a computerized planning system that enables the Army to manage its enlisted force by MOS, grade, and, optionally, by years of service for periods extending several years into the future. The management functions supported by the MOSLS include initial entry training, promotion, reclassification, and year-group management. General Research Corporation completed development and demonstration of

a prototype of the MOSLS in March 1981. An operational version of the system is currently being developed, with completion of a Phase I system scheduled for the end of November 1982 and a Phase II system 15 months later. One of the fundamental specifications for the MOSLS is that its projections be consistent in the aggregate with corresponding projections made by ELIM-COMPLIP. The demonstration of the prototype confirmed that this objective had been achieved. Another specification for the MOSLS is that it have a mobilization capability.

2.2 System Functions. To accommodate mobilization planning, the modifications identified as necessary for ELIM-COMPLIP and MOSLS will provide:

- Time-phased training base output requirements by MOS for all levels of mobilization.
- Time-phased (10 day increments to at least 180 days) projections of trained manpower in all categories required for all levels of mobilization for the current year, and the period of the Five Year Defense Program (FYDP), by grade and MOS.
- Determination of priorities for MOS training based on projected shortages and training duration required for the various MOSs.
- Projections of inductee calls required to achieve operating strength objectives.
- Handling of the phase-up and phase-down of strength in a common structure.
- Accountability for reservists who require Initial Entry Training.
- Specific accounting of projected strengths, gains, and losses for each category of manpower--Regular Army, Draftee, ARNG and USAR Selected Reserve, Individual Ready Reserve, Inactive National Guard, and recalled retirees.

- Analysis of the maintainability of strengths in a specific OCONUS zone for specified assignment eligibility constraints.
- Adaptability to a variety of mobilization policy scenarios. (See Appendix F for a review of the primary personnel policy parameters that would directly affect FORECAST.)

2.2.1 Accuracy and Validity. The ELIM-COMPLIP system has experience in making strength projections with 0.5% error rate out to at least 12 months. A goal of similar accuracy for mobilization planning is desired; however, under mobilization conditions uncertainties are greater (such as casualty projections versus actual casualties, etc.).

2.2.2 Timing.

- The timing requirement for updating the ELIM-COMPLIP/MOSLS data base normally will be monthly.
- Under exceptional, unusual or emergency conditions, the ELIM-COMPLIP/MOSLS data base can be restored or updated at any time, contingent upon computer time availability.
- The timing requirement for reconstituting the data base under normal conditions is overnight.
- Interactive query responses should be displayed on a CRT within 3 seconds of the query.
- Interactive query responses that require hardcopy may require up to 4 hours.
- The timing requirement for corrections processing under normal operation will be overnight.
- A complete run of ELIM/COMPLIP, after the data base has been updated, is required in 4 hours under normal conditions.
- A complete run of MOSLS, after data base update, must be accomplished overnight.

2.3 Flexibility. There are different levels of mobilization, ranging from a very limited call-up of reserves to a total mobilization, with great variations in personnel policies. The FORECAST systems (ELIM-COMPLIP and MOSLS) must be able to accommodate a variety of policy scenarios, including at least the following parameters to the extent described in Appendix F.

- Attrition loss management.
- ETS, immediate reenlistment and extension loss management.
- Enlistment policy: variations in term of enlistment, including indefinite enlistments.
- Combat zone assignments, including indefinite tours.
- Combat zone assignment eligibility constraints.

While ELIM/COMPLIP and MOSLS have always been developed with these kinds of flexibility in mind, the requirements for mobilization put an additional burden on these systems well beyond the impacts previously experienced. Considerable care will be required to create or enhance the various programs to permit this kind of flexibility while maintaining reasonable economy and efficiency of operation.

SECTION 3. ENVIRONMENT

3.1 Equipment Environment. The mobilization versions of these systems will operate on the same computer systems currently used for their peacetime versions. Primary production would be accomplished on an IBM 3033, while file editing, output query, and some related on-line operations would be performed on an IBM 4331 or 4341.

Core requirements for the various programs would be similar to the requirements of the current programs with one significant exception: the Inventory Projection Module in ELIM/COMPLIP, which now requires approximately 1200K bytes of virtual core, will be reprogrammed so that core requirements can vary with the mobilization scenario. It is estimated that for many scenarios the IPM core requirement will be less than 1000K bytes, while for a few scenarios, an IPM of over 2000K bytes will be required.

3.1.1 Additional Hardware Requirements. With the requirements defined above, some additional hardware will be required.

One additional IBM 3350-equivalent disk will be required to accommodate additional ELIM/COMPLIP run streams and expanded data bases on the IBM 3033. One additional IBM 3370 disk will be required for the IBM 4331.

Additional IBM 3278/9 terminals and controllers will be required to provide access to these systems for action officers not currently directly involved in FORECAST production. In particular, the Mobilization Plans Division in the ODCSPER will require a terminal to assist the System Manager in defining scenarios, and to access system outputs. Other users, not yet specifically identified, bring the expected number of new terminals to 4-6, mostly 3279 graphics terminals.

It is not anticipated that the development effort itself will require any additional hardware. However, development of expanded Reserve Component strength projection systems, not a part of the ELIM/COMPLIP or MOSLS system structures, may require additional terminals to the IBM 4331, and additional disk space on the 4331 and/or the IBM 3033.

3.2 Support Software Environment. It is not anticipated that any support system software will be required that has not already been specified for the peacetime versions of these systems.

3.3 Interfaces. The interfaces between ELIM/COMPLIP and MOSLS and other applications programs are discussed, module by module, in Sections 4.3 and 4.4.

3.4 Security and Privacy. Several elements of these systems when operating in mobilization mode, will have classified inputs and/or outputs. All programs accessing the MOBPERSACS data base (and any derivative of it which contains activation dates for units) will require secure processing. In addition, all system outputs resulting from such a classified activation schedule must be classified SECRET.

3.5 Controls. User controls for both scenario definition and for quality control are defined in current User Manuals for the existing systems. A new Problem Formulator for ELIM-COMPLIP currently being designed (discussed in Section 4.4.1.7) will place all control files under a single, interactive program. The MOSLS Preprocessor fulfills the same function. Changes to the module-specific control requirements are discussed in the relevant part of Sections 4.4.1 and 4.4.2.

SECTION 4. DESIGN DETAILS

4.1 General Operating Procedures. The ELIM-COMPLIP and MOSLS systems, modified for mobilization strength planning and management, will be operated with essentially the same procedures used for the production systems in current use or under development. All major input files such as the EMF and DCSPER-46 extracts would continue to be received from MILPERCEN on a monthly basis and the FORECAST data bases (e.g., the large and small tracking files) would be updated from these extracts as they are received. Other inputs such as casualty rates and personnel authorizations would be processed by FORECAST on an "as changed" or "as needed" basis. Such changes may be either exogenously generated or generated in response to particular mobilization scenarios defined by mobilization manpower planning staffs who are using FORECAST.

All elements of these systems, other than the Data Processing Modules, will be operated on an "as needed" basis in support of mobilization planning requirements, concurrently with the routine operation of the existing peacetime systems. In the event of an actual mobilization, these systems will replace the peacetime systems and will be operated in a production mode consistent with the strength management requirements under such a mobilization.

Detailed specification of the required changes to systems begin at Section 4.4, following a brief exposition of the current features and structures of these systems and a summary of modified system data requirements.

4.2 FORECAST System Logical Flow. The overall structure of the FORECAST system concept is presented in the Functional Description. More detailed presentations of the structures of ELIM-COMPLIP and MOSLS, operating in a mobilization planning mode are in the following subsections.

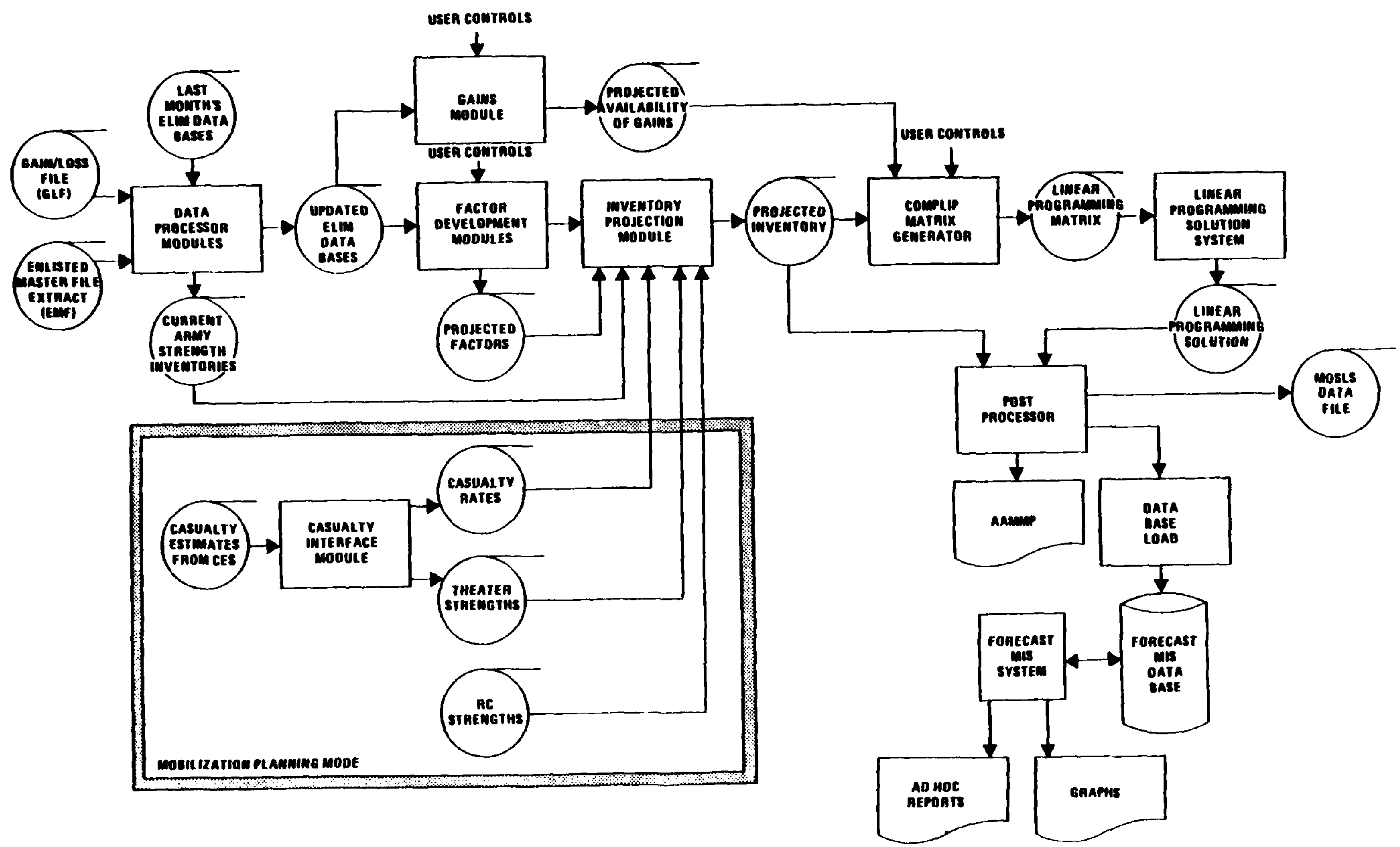

Figure 4.1. Overview of ELIM-COMPLIP Data Flow

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4.2.1 ELIM-COMPLIP. Details of the ELIM-COMPLIP structure and data flows are provided in the existing systems documentation, especially in the Executive Briefing (Appendix G). Changes to the standard data flows for mobilization planning are shown in Figure 4.1. This figure also reflects ongoing changes to the Report Generator and the development of the FORECAST Management Information System (MIS). These ongoing revisions are discussed further in Subsection 4.3.2.1.

4.2.2 MOSLS. Figures 4.2 to 4.5 contain schematics of the Phase I production version of the MOSLS, which is currently under development.

4.2.2.1 Overall System Schematic. Figure 4.2 is a very high level schematic of the overall system, showing the following four subsystems:

- Data Base Subsystem, which both creates a major part of the MOSLS Data Base and extracts data from it. Inputs to this subsystem include both automated files created by other systems and user inputs provided via remote terminal, with full-screen-panel displays prompting for the needed data and control information. In addition to the data supplied by the Data Base Subsystem, the MOSLS Data Base contains the results of the MOSLS forecasts provided by the Postprocessor Subsystem. The Data Base Subsystem presents data extracted from the Data Base in tabular and graphic displays, both for regularly scheduled standard reports and in response to ad hoc queries.
- Preprocessor Subsystem, which extracts data from the MOSLS Data Base and creates files used as inputs to the MOSLS projection models. A major function of this subsystem is the generation of loss rates and loss projections.
- Processor Subsystem, which formulates and solves network and linear programming projection models in accordance with user specifications, using data from the MOSLS Data Base and the Preprocessor Subsystem.

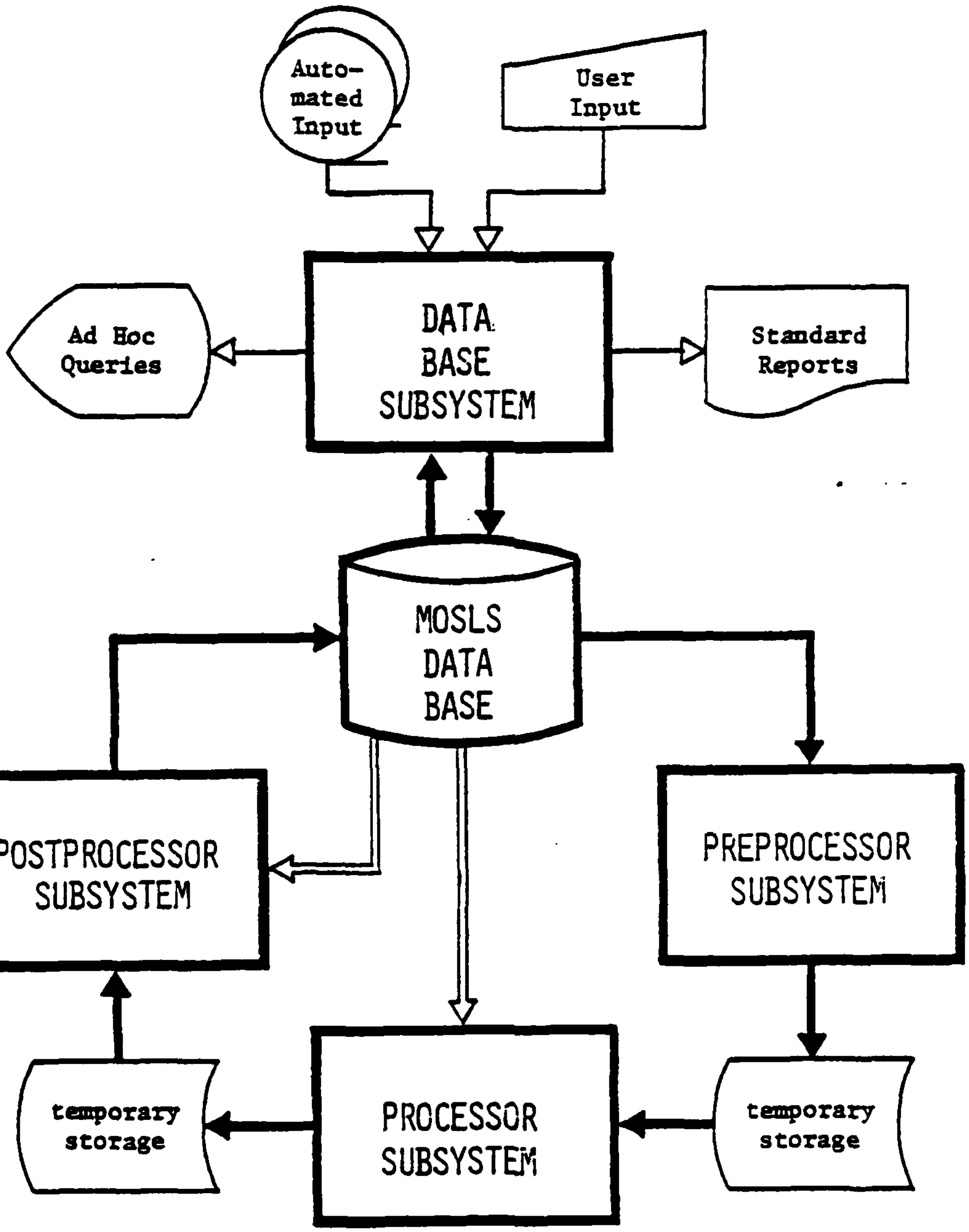


Figure 4.2. MOSLS System Schematic

- Postprocessor Subsystem, which performs a variety of computations using data from the MOSLS Data Base and the Processor Subsystem. A major function of this Subsystem is the projection of input requirements for AIT and OSUT, based on the training output requirements determined by the projection models in the Processor Subsystem. These training requirements are consistent with the projections of NPS and PS gains produced by ELIM-COMPLIP.

4.2.2.2 Data Base Subsystem. Figure 4.3 shows further details of the Data Base Subsystem. Following are the components of this subsystem:

- Chart Subsystem, which creates files defining by effective and termination dates the CMFs, valid MOS-grade pairs, career progression paths, and MOS conversions, with the latter defined in terms of losing and gaining MOS-grade pairs, the percentage distribution of strength from the losing into the gaining MOS-grade pairs, identification of deleted and new MOSs, and for each new MOS specification of a like MOS for which historical data exist that can be used as a basis of making loss projections for the new MOS. All inputs to this subsystem are provided by terminal, with AR 611-201 and associated change circulars used as source documents.
- Parametric Control Subsystem, which creates a file n-taining user controls needed generally by more than one subsystem--e.g., the time periods to be used for the projection and the parameters (weights/costs and percentages) for the projection models' objective functions. User inputs/controls that are specific to an individual subsystem--e.g., the Authorizations Subsystem--are considered to be a part of that subsystem.
- Projection Interface Subsystem, which creates files of data from ELIM-COMPLIP that are used to ensure that the projections of the MOSLS are consistent with the more aggregate projections in a specified AAMMP alternative

MOSLS DATA BASE SUBSYSTEM

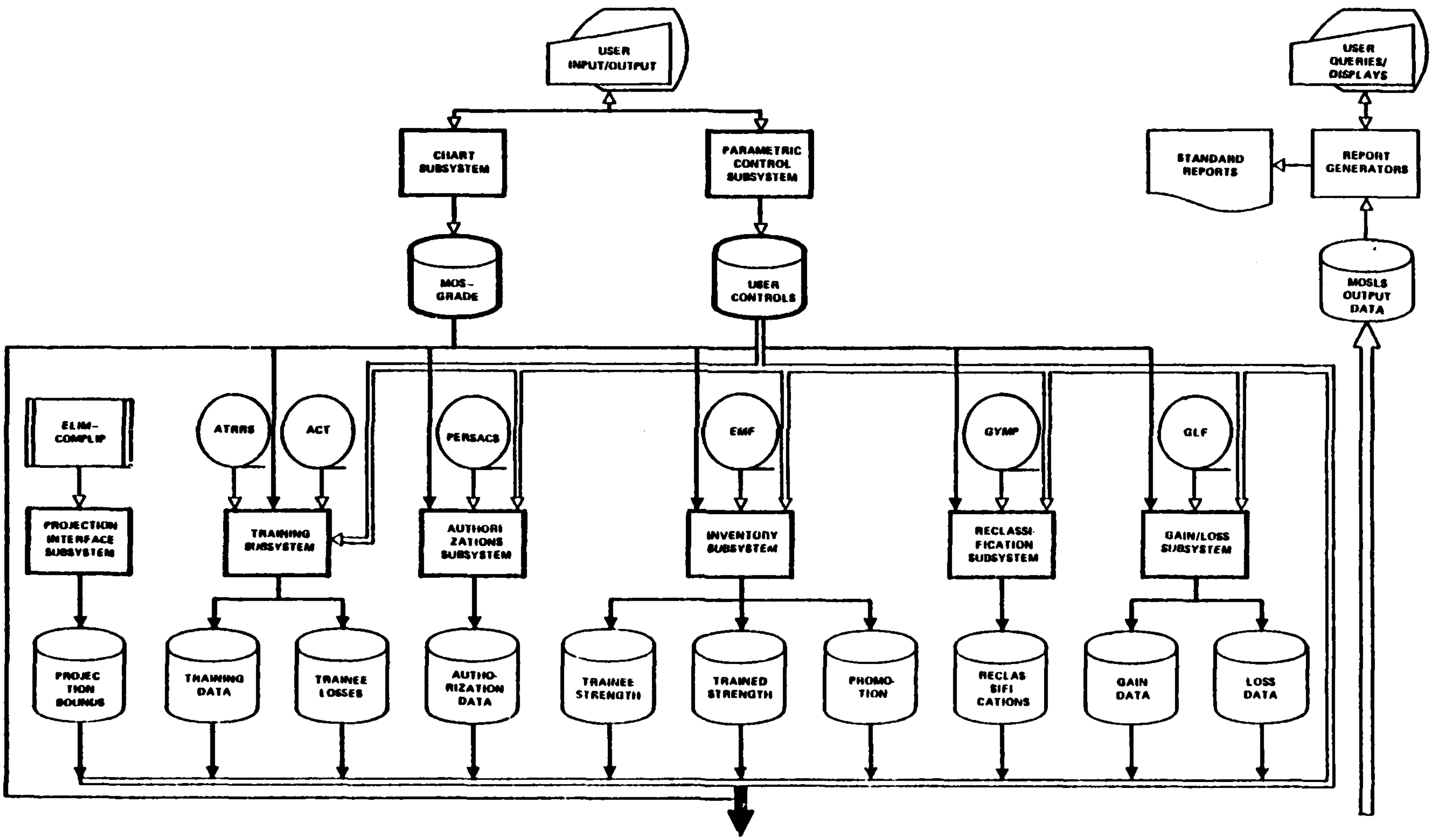


Figure 4.3. MOSLS Data Base Subsystem

produced by ELIM-COMPLIP. These data include the alternative number; projected NPS and PS gains; retention rates for each type of accession and factors by which the fraction of each accession cohort remaining at the end of each month can be broken out by trainee versus trained strength; Force Structure Allowance for enlisted operating strength; projected enlisted strength in the transient, holdee, and student accounts; and for each of the MOSLS loss categories the projected losses for the total enlisted force and broken out by years of service.

- Training Subsystem, which compiles training data--e.g., course lengths and, if feasible, course recycle and transfer rates--and projections of trainee losses. Input sources include ATRRS, ACT, and ELIM-COMPLIP.
- Authorizations Subsystem. Further details of plans for this subsystem, now designated the Personnel Authorizations Module (PAM), are shown in Figure 4.4. The primary input to the PAM is a PERSACS tape, containing official authorizations data from SACS, with the option of including the impact of selected BOIPs. Users--e.g., at the SSC-NCR or MILPERCEN--will be able, via remote terminal and with prompts provided by the PAM software, to retrieve and modify the authorizations to reflect planned changes, e.g., in TOEs, MOS structure, and equipment/BOIPs. There will also be a capability for users, e.g., in ODCSPER or PA&E, to introduce notional or "what if" changes--e.g., in the force structure (i.e., add or subtract actual or type units), TOEs, or overall strength. Before the authorizations are input to the MOSLS Target Generator (MTG), there is an edit for valid MOS-grade pairs. Any obsolete MOSs are eliminated on the basis of data concerning MOS conversions contained in the MOSLS Data Base. The MTG then generates the targets used in the MOSLS projection models. This process is under user control, with the option of modifying grade

MOSLS-PAM SCHEMATIC

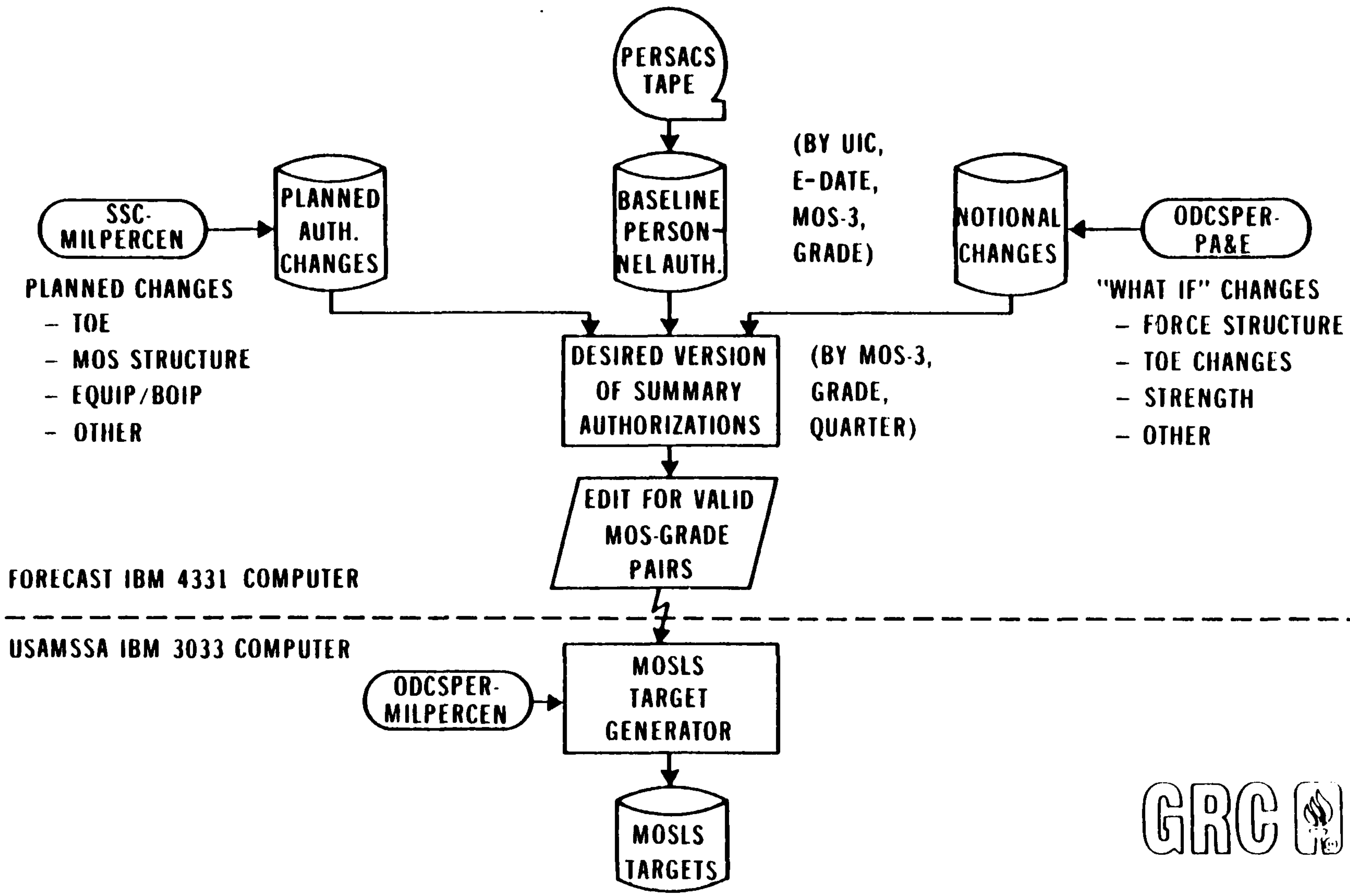


Figure 4.4. MOSLS - Personnel Authorizations Module (PAM)

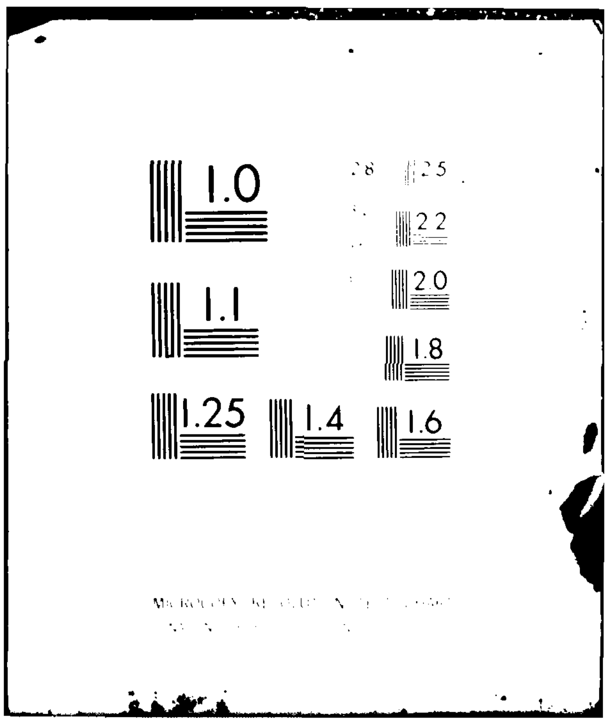
distributions for the MOSs in specified CMFs to reflect career management concerns or increasing target strength levels for SIMOS.

- Inventory Subsystem, which processes extracts of the EMF as of the end of each month. For those who are a part of trained strength, there are strength counts broken out by MOS-3, grade, and years of service (YOS) for the most recent and 36 prior months. Data from the more recent month are used for the current inventory input to the projection models. The earlier data are used in the generation of loss rates. For those who are trainees, there are strength counts by MOS for which training is in process, when available on the EMF, months of service, and type of last accession (i.e., NPS or PS). For the most recent EMF, counts are made of those eligible for promotion, according to prescribed criteria.
- Reclassification Subsystem, which develops factors, based on data from GYMP (Year Group Management Data Base), that indicate the incidence of those types of reclassifications that the Army does not control for the purpose of MOS strength management. This subsystem also develops factors indicating the frequency with which retraining is required for reclassified personnel and PS gains.
- Gain/Loss Subsystem, which processes monthly gain/loss transaction files (GLFs) to create 36 months of history used for the generation of loss rates. This file also creates factors used to break out by grade the projected PS gains obtained from ELIM-COMPLIP.
- Report Generators. In the upper right of Figure 4.2 are shown the file of MOSLS output data and the subsystem that produces standard reports and handles ad hoc queries of the MOSLS Data Base.

4.2.2.3 <u>Preprocessor Subsystem</u>. As indicated in Section 4.2.2.1, this subsystem extracts data from the MOSLS Data Base and creates the files to be used to formulate the projection models.

AD-A116 143 GENERAL RESEARCH CORP MCLEAN VA MANAGEMENT SYSTEMS DIV F/G 5/9
MODIFICATIONS TO ELIM-COMPLIP AND MOSLS FOR MOBILIZATION STRENG--ETC(U)
MAY 82 K D MIDLAM, W E BARTLETT, E BERGE MDA903-81-C-0649
UNCLASSIFIED GRC-1257-02-82-CR NL

2 OF 4
AD A
116 143


1.0
2.5
2.2
1.1
2.0
1.8
1.25
1.4
1.6

A major function of this subsystem to generate loss rates and projected losses. One of the fundamental specifications for the MOSLS is that its loss projections be consistent in the aggregate with corresponding projections of ELIM-COMPLIP. The means by which this is accomplished is to compute an "unnormalized" loss rate for each MOS-grade pair (or each valid combination of MOS, grade, and YOS) as an average of the rates experienced over the most recent 36 months. This rate is then "normalized" so that the projection of losses summed over all MOS-grade pairs for each projection period equals that of ELIM-COMPLIP. While elaborate procedures are built into ELIM to make it possible to project loss rates that vary over time, the Phase I MOSLS does not have any provision for projecting <u>unnormalized</u> rates broken out by MOS-grade pairs that vary over time except where that variation is induced by projected MOS conversions. (The normalized rates do reflect the variation of the aggregate ELIM rates.)

The modification in the procedure just described in order for the MOSLS to project casualties associated with a planned or postulated mobilization is discussed in a subsequent section (4.4.2.2).

4.2.2.4 <u>Processor Subsystem</u>. Figure 4.5 is a schematic of the Processor and Postprocessor Subsystems. The function of the Processor is to formulate and solve the projection models which produce the MOSLS forecasts. As shown in Figure 4.5 and listed in Table 4.1, four types of projection models are included in the Processor of the MOSLS. The first two and last two model types, respectively, constitute two families of models. The principal distinction between the two is the inclusion of the YOS dimension in the latter. Each of the model families represents and will provide management data for the functions of promotion, reclassification, reenlistment, accession, and attrition. The first also deals with initial entry training, while the second deals with objective-force or year-group management. The first family of models will definitely have a mobilization capability. The second

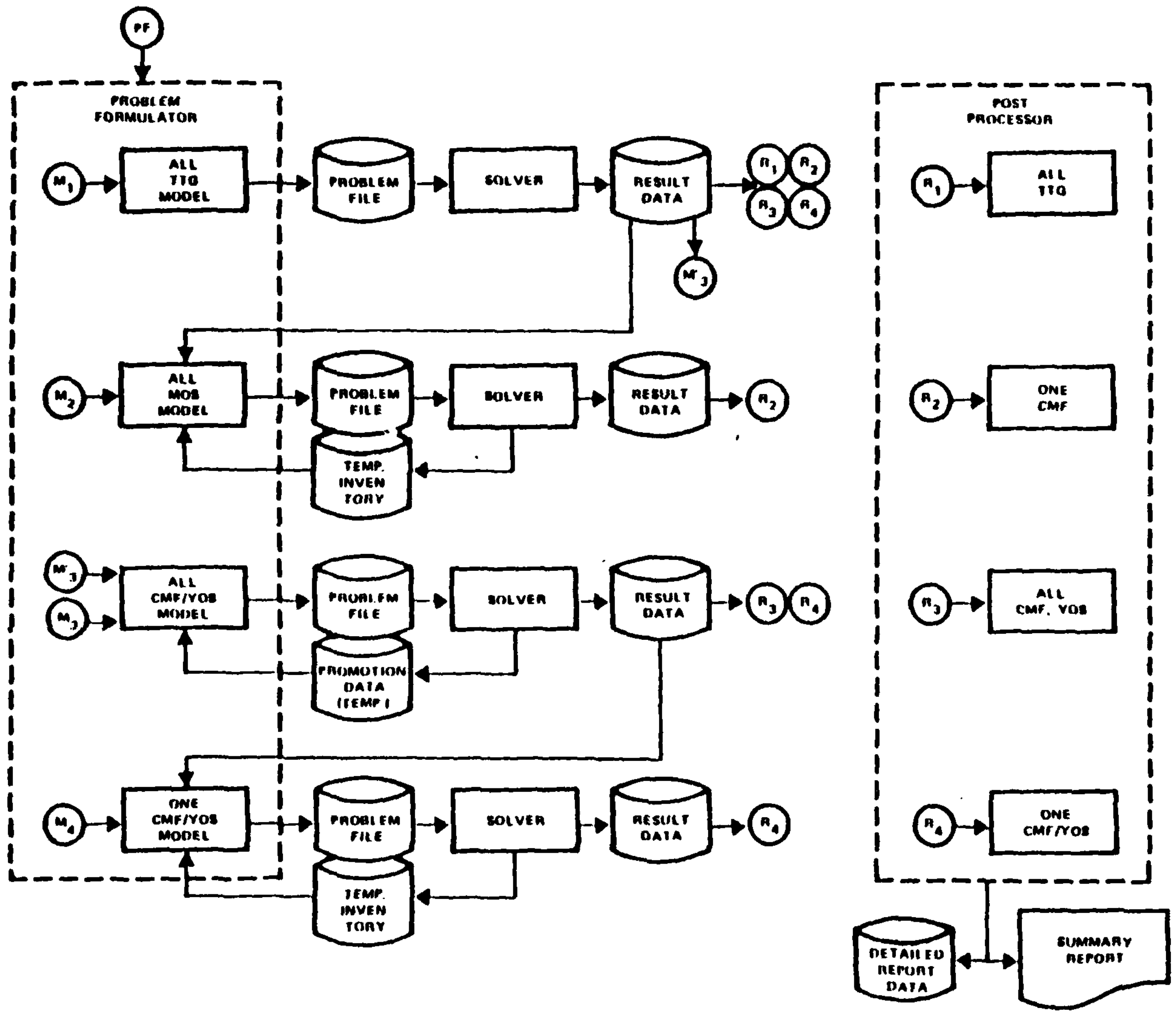


Figure 4.5. Schematic of the MOSLS Processor and Postprocessor

TABLE 4.1

PROJECTION MODEL SPECIFICATIONS

MODEL	BREAKOUTS	TIME SPAN	NUMBER OF PERIODS	SIZE OF PERIODS	FUNCTIONS	MOBILIZATION?
All TTG*	CMF/TTG* Grade	6-7 FYs	Approx 12	Variable: Quarterly To Annual	Training Promotion	YES
					Reclassification	
All MOS	MOS Grade				Reenlistment	
					Accession	
					Attrition	
All CMF-YOS	CMF	5 FYs	5	Annual	Objective Force Mgt.	If Desired
	Grade				Promotion	
	YOS				Reclassification	
One CMF-YOS	MOS				Reenlistment	
	Grade				Accession	
	YOS				Attrition	

*Training Time Groups--Groups of MOSs with Approximately Equal AIT Time

can, if desired. It appears that concern for year-group management will have progressively lower priority as the level of mobilization increases.

Within each of the families of models listed in Table 4.1 there are two types of model, the second operating at the MOS level of detail and the first dealing with groups of MOSs. For the YOS models, the grouping is by CMF, while for the other family there is a grouping within each CMF by "training time groups" (TTGs)--i.e., groups of MOSs with approximately equal course lengths for AIT leading to MOS-award--or, for certain MOSs, OSUT (where the OSUT course length used for formulating TTGs is the equivalent time for basic training.). The more aggregate models cover the entire planning horizon, with the maximum time spans listed in the table. The more detailed models, covering only one period at a time, break out the projections of the aggregate models to the MOS level of detail. (Alternatively, these models can be formulated to cover all time periods, but only one CMF at a time.) The reason for this approach is to prevent model size from exceeding the feasible limit for the use of optimization procedures.

The use of optimization procedures makes it possible to provide data designed to meet information needs that are formulated in the most natural way. For example, the system will determine the requirements for initial entry training in order to provide the best possible fit between the projected number of people and the desired level in each MOS and grade, where all relevant policies--e.g., with respect to reclassifications, promotions, and reenlistments--are specified.

The optimization procedure used for the MOSLS is a combination of network flow and linear (or goal) programming models. For the network models, which represent a special class of LPs, there are codes that provide solutions very much more rapidly than the more general codes available for solving LPs. The procedure being used for the MOSLS is first to set up and solve a network model; then to set up an LP that incorporates the network model plus some added, non-network, linear constraints and solve that using the network solution to provide an advanced start toward solution of the LP. Table 4.2 provides some data

TABLE 4.2

PROTOTYPE PROJECTION MODEL STATISTICS

MODEL TYPE	ALL-TTG	ALL-TTG	ALL-MOS
NUMBER OF PERIODS	3	12	1
SIZE			
NODES	1,424	5,794	3,400-3,450
ARCS	5,361	21,946	13,515-14,668
ADDED CONSTRAINTS	198	774	200-225
RUN TIME (CPU MINUTES)			
PROBLEM FORMULATOR	0.90	3.17	0.71-0.78
PNET	0.13	1.52	0.35-0.42
MPSX	3.77	77.42	2.53-2.88

on prototype model sizes and solution times. (The YOS models listed in Table 4.1 were not implemented in the prototype.) Developments currently under way provide a basis for predicting the solution times for the production MOSLS will be substantially less (probably at least 50% less) than those listed. However, for the near term any significant expansion of the size of the MOSLS projection models is clearly inadvisable. This point is discussed further in Section 4.4.2.3.

4.2.2.5 Postprocessor Subsystem. The Postprocessor performs computations necessary to convert the data produced by solution of the projection models into the form needed by the user. Following are examples:

- The projection models determine the training gains to each MOS-grade pair in each projection period. The Postprocessor computes the number of persons who must start training (i.e., training requirements) by MOS and time period in order to yield the projected gains to trained strength. This computation accounts for course lengths, all types of course attrition (assuming that relevant data can be obtained)--i.e., losses to the Army, course transfers, and recycles. The projected source of these training requirements is identified--i.e., NPS and PS gains and reclassified personnel--and consistency with ELIM-COMPLIP's projection of NPS and PS gains is maintained.
- As indicated in Table 4.1, the time periods used in the MOSLS projection models range in length from quarters to years. ELIM-COMPLIP, on the other hand, currently uses monthly periods through the 6 to 7 FYs covered by the AAMMP. Because projections of the MOSLS are constrained to be consistent with those of ELIM-COMPLIP, it is possible for the MOSLS Postprocessor to use interpolation to break the MOSLS projections out by the periods used in ELIM-COMPLIP.

4.3 System Data

4.3.1 Inputs. Static data are input to ELIM-COMPLIP and MOSLS from several sources. Changes to existing inputs and specifications of new input sources are contained in the following sections.

4.3.1.1 Enlisted Master File (EMF). An extract, on tape, of a month-end snapshot of the EMF is currently provided by MILPERCEN. Some additional EMF data elements will be required for mobilization strength management. These will include:

- Date Returned From Last Overseas Assignment (DROS)
- Area of Previous Overseas Tour (APRAS)
- Assignment Eligibility Availability Code (AEACD)
- Deployability Code
- Mobilization Personnel Category Code (PMC)

4.3.1.2 DCSPER-46 (GLF). No new data elements need be added to the extract now provided monthly on tape by MILPERCEN.

4.3.1.3 Reserve Component Strength Projections. The ELIM-COMPLIP and MOSLS systems require data on reserve component strengths available for activation at specific times in the future. No existing system is available to provide these data directly. Until the time that such a system is developed, surrogate projections will be made by combining data from the MOBPERS RC Composite File and the RCPAC Data Base (see Tables 2.3 and 2.4 in Tab 3).

Regardless of the source of the data, ELIM-COMPLIP and MOSLS will require reserve component strengths, adjusted by an approved yield rate methodology for all valid combinations of these parameters:

- Activation Month
- Personnel Mobilization Category Code (PMC)
- Primary Military Occupational Specialty (PMOS)
- Grade

In addition to these data elements now in the MOBPERS RC Composite File, an additional data element, not now in the file, is required--an indicator that the reserve enlistee has not completed BCT.

If future strengths must be estimated directly from the current MOBPERS files (as outlined in 4.4.4) then the Unit Processing Code (UIC) for Selected Reserve and National Guard personnel will also be a required parameter in an MOBPERS extract for the classification of available reserve strengths.

4.3.1.4 Casualty Estimates. In order to support the User Estimates methodology and the Direct Conversion of Wargame Data methodology certain data input is required for the FORECAST CES to perform its function of providing the MOSL and ELIM-COMPLIP systems with compatible input. Both methodologies are designed to incorporate, as far as is possible, formats, rates, and factors from the CAA CES-I report. It is assumed that most major Army wargaming of war theater losses will incorporate the methods of CES-I and generally present data in the formats described therein.

4.3.1.4.1 User Estimates Methodology

4.3.1.4.1.1 Casualty Stratification Model (CSM).

Vulnerability Rates and Loss Factors

As explained in the Casualty Estimation Study-Part I (CES-I), CSM is part of the CAA WARRAMP (Wartime Requirements for Ammunition, Materiel, and Personnel) system of models used to forecast the Army's requirements for personnel, ammunition, and materiel to fight a future conflict. CSM will provide the source of vulnerability rates for functional categories and loss rates for MOS. The FORECAST Casualty Estimation System (FORECAST CES) will use enlisted vulnerability rates and loss factors only for selected functional categories as follows:

Functional Categories	Vulnerability Rate	Number of MOS (Loss Factors)
Infantry	.467	4
Armor	.178	9
Fld Artillery	.105	16
Air Def Arty	.030	12
Engineer	.061	23
Cbt Medic	.024	1
All Other	.135	(No distribution to MOS level)
	1.000	65 MOS

Loss factors for MOS are carried to the fourth decimal. These rates and factors will be programmed into the subsystem. MOS loss factors must be reprogrammed into the subsystem periodically to reflect those changes which occur in the MOS structure of the Army.

Rate Loss Record

Description	Type	No.	Characters
MOS	AN	3	PIC X(3)
Loss Factor	N	4	PIC V9999
Vulnerability Rate	N	3	PIC V999
Functional Area	AN	15	PIC X(15)

Summary of Theater Casualties and Losses

It has been previously stated that wargaming data produced by the WARRAMP system of models and provided as input to support analyses such as OMNIBUS may require direct conversion (Direct Conversion methodology) of population and loss data to be compatible with MOSL and ELIM-COMPLIP systems; or, such analyses may provide a ready source of information upon which users of the FORECAST CES may derive their own rates for loss by cause (User Estimates Methodology). In either case, the format for data required for input to FORECAST CES is shown in the CES-I report as an example of the computer aggregation routine developed for the Casualty Stratification Model (CSM).

The format of the theater summary of casualties is shown below:

Time Periods: 10 days (M-Day to M+ 180 days with a total enlisted population column)

<u>Battle Casualties</u>
- KIA
- CMIA
- WIA
- RTD from Hospital
- DIED in Hospital
- EVAC from Theater
- Treated--Not Hospitalized
- Total--KIA, CMIA, WIA

<u>Nonbattle Casualties</u>
- DNBI
- RTD from Hospital
- DIED in Hospital
- EVAC from Theater
- Treated--Not Hospitalized

<u>Administrative Losses</u>
- AWOL
- Desertion
- Confinement
- Missing--Not in Action

<u>Summary of Theater Population (10-day Time Periods)</u>:

This information has normally been provided in previous wargaming analyses. CSM has the capability of producing the data:

Time Period: 10 days (M to M+180 days)
Total Enlisted in Theater

4.3.1.4.1.2 <u>Manual Input - Loss Cause Factors.</u> Summaries of theater population and casualty/loss data as described above are required to support the <u>Direct Conversion</u> methodology as explained later in this paper. The summaries of theater data described above may be used in the <u>User Estimates</u> methodology to derive loss rates by loss cause when the user has no better factors to use in making loss estimates against new population inputs. The FORECAST CES will be designed so that a

user may input data directly from the theater summary format described above into a "Help" display and the computer program will calculate the factors for him. Data will be manually input via CRT display into the following format:

	Per 1	Per 2	thru	Per 18
Theater Population	000000	00000		00000
Battle Casualties				
KIA	000000	00000		00000
CMIA	0	0		0
EVAC	0	0		0
DIED	0	0		0
RTD	0	0		0
	Per 1	Per 2	thru	Per 18
Non-Battle Casualties				
DNBI	000000	00000		00000
DIED	0	0		0
EVAC	0	0		0
RTD	0	0		0

Admin* 5.6 Losses/1000 Avg Monthly STR will be used

* Computer program will apply this factor against a population computation.

Once the data above is entered, a computer program automatically computes the Enlisted Loss Cause Factors to be used in distribution of casualty and loss estimates. The computed factors are posted to a CRT display in the following format:

BATTLE CASUALTIES

TIME PER	KIA	CMIA	DIED	EVAC	WIA
01	.0000	.0000	.0000	.0000	.0000
02	.0000	.0000	.0000	.0000	.0000
thru Period 18					

NON-BATTLE CASUALTIES

TIME PER	DIED	EVAC	HOSP
01	.0000	.0000	.0000
02	.0000	.0000	.0000
thru Period 18			

ADMIN LOSSES

Not required. The computer program will calculate this figure using the CES I loss rate of 5.6 per 1000 average monthly strength.

These factors are used by the computer program in conjunction with new population inputs (see TO&E System below) to compute the initial gross losses by cause.

4.3.1.4.1.3 TO&E System. The FORECAST CES, in order to support the User Estimates Methodology, requires an internal computer file where MOS and Grade level of detail by unit is available for selection by users to provide the base population. Pertinent TO&E data must be extracted from the TO&E System maintained by USAMSSA for ODCSOPS and copied into the FORECAST CES. This FORECAST CES TO&E file will provide the user with the means to select and to vary the population at risk within each time period. This selection will be input manually into the system by the user through an interactive CRT display. The user will be presented with a tabular list of the major units available and will be required to select the number of such units present in the Communications Zone (COMM-Z) and the Combat Zone (COMBAT-Z).

4.3.1.4.2 Direct Conversion Methodology

4.3.1.4.2.1 Casualty Stratification Model CSM

- Theater Casualties (MOS and Grade)

These data are required to support the Direct Conversion of Wargame Data methodology where data from a typical analysis must be converted into MOSL and ELIM-COMPLIP systems compatible data input. The format for the data required for input to FORECAST CES is patterned on the format shown in the CES I report as an example of the report generator capability of the CSM. Data format is as follows:

Total Theater Casualties WARMAPS Format

Time Period: 10 day (18 periods)	
MOS	PIC X(3)
Grade	PIC X(2)
Casualties	PIC 9(5)V99
Casualty Rate/1000/day	PIC 99V99

• Summary of Theater Casualties and Losses

The requirement of this data has been discussed under the User Estimates methodology (paragraph 4.3.1.4.1.1).

4.3.1.4.2.2 FORECAST CES Computer Program. Using the two basic inputs described above, the computer program will calculate the detailed loss data and convert it to MOSL and ELIM-COMPLIP compatible output. This output will be produced on tape.

4.3.1.4.3 Patient Flow Model (PFM). This CAA operated model is designed to simulate the flow of inpatients through a multiechelon hospitalization/evacuation system. It contributes to the WARRAMP system of models data output by processing theater casualties and losses. The PFM Level 3 (Continental USA) provides data relative to the disposition of theater evacuees while in the CONUS. The MOSL and ELIM-COMPLIP systems require PFM Level 3 data in the following format:

Time Period: 10 days (18 time periods)
Patient Population
Returns to Duty
Deaths in Hospital
Disability Separation

This information is required to support data inputs to the MOSL and ELIM-COMPLIP systems coming from either the User Estimates or the Direct Conversion methodologies.

4.3.1.5 MOB PERSACS. When a mobilization calls for the activation of USAR and/or USANG units, MOB PERSACS will provide input to the PAM in place of PERSACS. The capability will be there to perform all of the

same types of user modifications and automated edits that are described in Section 4.2.2.2 with reference to operation in a peacetime mode.

A new MOB PERSACS is produced about twice a year. In general, the data elements and formats are the same as for PERSACS, with the exception that there are some added data elements--e.g., a field for required wartime strength and a code that identifies positions that can be filled by retirees.

Additional information that must be included in the MOSLS Data Base for each USAR and USANG unit is the activation and deployment schedule. This information will be input via terminal by a designated user, the source being the Time-Phased Force Deployment List (TPFDL)[1] applicable to the specific mobilization for which a projection is to be made.

4.3.1.6 MOS-Grade File. The inputs for the MOS-Grade File must be provided by a system user/operator via terminal. The basic source documents are AR 611-201--specifically the career progression charts for each CMF--and the circulars published to provide guidance for implementatin of each change published to AR 611-201. Such changes are published twice a year.

There are several subsystems of the MOSLS that must deal with the MOS conversions that are documented in the previously referenced circulars. These include the following:

- The PAM, which will use the conversion data in the subject file to perform edits on any obsolete MOSs that are encountered.

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[1] For each Army operation plan (usually geographically oriented, i.e., Europe, Middle East, Far East) there is a Time-Phased Force Deployment List (TPFDL) that tells which units will be deployed and when they will be deployed. Units contained in a TPFDL are generally both active and reserve units.

- The Problem Formulator, which will set up arcs to carry flows between losing and gaining MOSs involved in MOS conversions.
- The Inventory and Gain/Loss Subsystems, which will use the conversion data to perform edits on any obsolete MOSs that re encountered when processing EMFs and GLFs.

For all of the preceding subsystems, it is necessary for the user to specify the percentages of spaces and personnel to be reclassified from a losing MOS to each gaining MOS involved in a conversion, as well as the start and end dates or set of such dates, if the conversion is time-phased. For new MOSs, the user must specify a "like" MOS for which historical loss rates are available that can be used to project losses for the new MOS.

The MOSLS MOS/Grade File identifies MOSs that re applicable only to the Reserves. Data for these Reserve MOSs are not used for peacetime projections but will be used for mobilization projections where the corresponding types of Reserve units/personnel are to be activated.

4.3.1.7 User Control Files.

4.3.1.7.1 ELIM-COMPLIP User Control Files. The mobilization versions of ELIM-COMPLIP will use the same control files as their peacetime counterpart. Some modification of the data elements and/or key words will be required.

4.3.1.7.2 MOSLS User Control Files. For mobilization projections, all of the user control files needed for the peacetime mode will be required--e.g., time periods, eventually (i.e., after development of the Phase II production system) the type of models to be formulated (i.e., with or without the YOS dimension), and the weights/costs and percentages needed for the projection models' objective functions to reflect the relative priority of fill of the various MOSs or MOS-grade pairs.

Most of the additional user controls needed for mobilization runs will be input to ELIM-COMPLIP and provided to the MOSLS via a suitably modified version of the Projection Interface Subsystem (see Section 4.2.2.2).

4.3.2 Outputs. The outputs from ELIM-COMPLIP and MOSLS are presented in the following subsections.

4.3.2.1 ELIM-COMPLIP Report Generator. The overall structure of the ELIM-COMPLIP Report Generator Module (RGM) has been modified substantially over the period October 1981 through March 1982. The following paragraphs summarize the new features that have been added to the ELIM RGM since publication of the most recent ELIM system documentation (June 1981). Specific new capabilities that the ELIM-COMPLIP RGM must provide in a mobilization environment are then outlined, with more detailed specifications provided in Section 4.4.1.5.

Figure 4.6 is a schematic of the current structure of the RGM and of the closely related FORECAST Management Information System (MIS). This section focuses on the data bases shown in this figure and on the output reports and graphs that may be generated. Section 4.4.1.5 will describe the computer programs used to maintain the data bases and to generate the reports and graphs.

Figure 4.6 shows two data bases, the RGM Intermediate File and the QBE[1] Data Base for the FORECAST MIS. The first of these, the RGM Intermediate File, contains all the data that are printed in the Active Army Military Manpower Program (AAMMP). Thus the RGM Phase 2 program does not have to do any complex computations; it simply formats the data for printing. There are currently six run streams for ELIM-COMPLIP. There is one copy of the RGM Intermediate File in each run stream. Each time a run stream is used, a complete new copy of the

[1]QBE-"Query-By-Example," an IBM software product operating on the FORECAST computer.

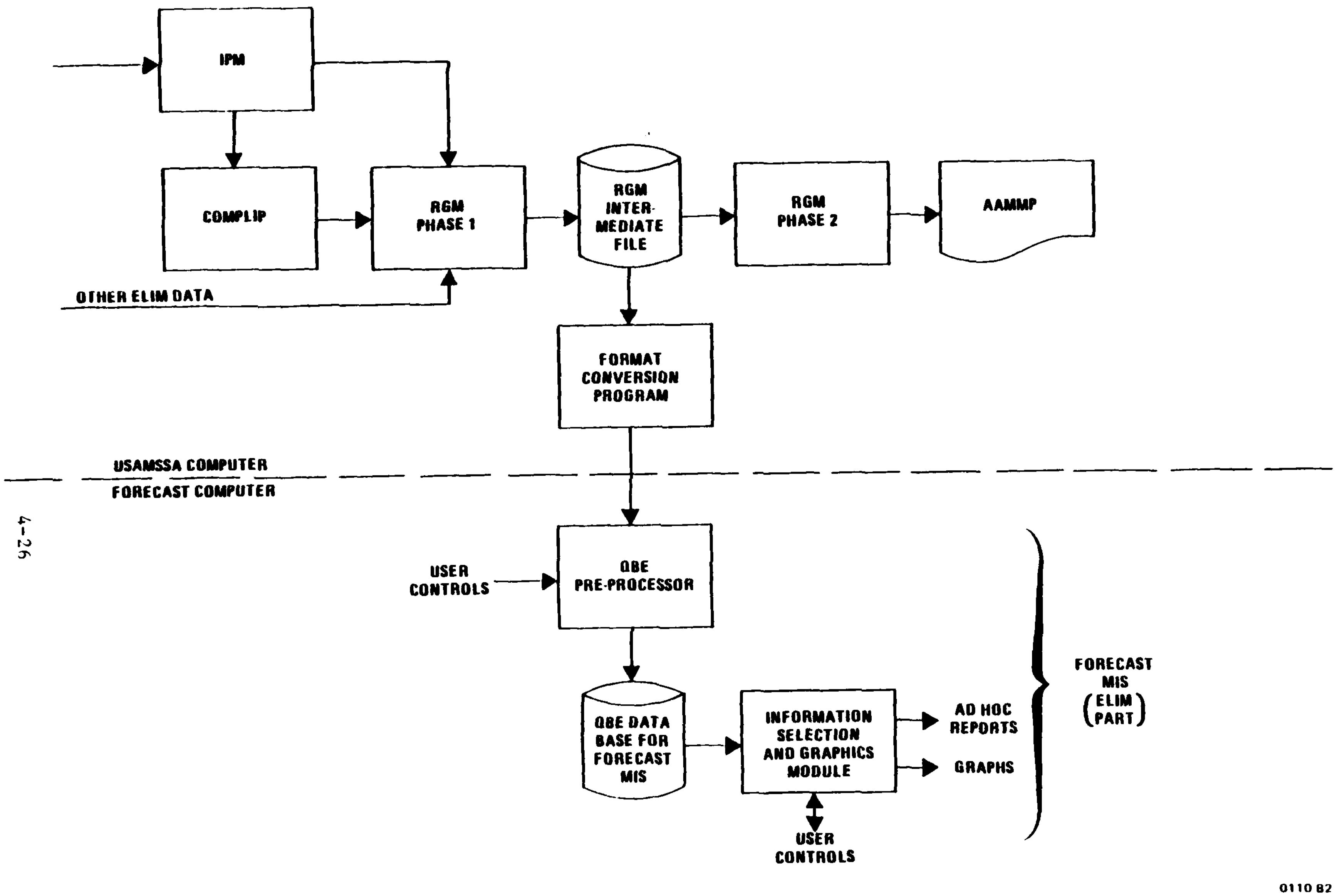

Figure 4.6. Schematic of ELIM Report Generator Module (RGM) and FORECAST Management Information System (MIS)

RGM Intermediate File is created in that run stream, and the previous copy is destroyed.

At any time, the user has the option of moving the data for a given manpower program from the RGM Intermediate File to a Query-By-Example (QBE) data base in the FORECAST MIS. The QBE Data Base can store data for 20 or more manpower programs at any given time. Some benchmark manpower programs, such as those created for the POM or the President's Budget, are stored in the QBE Data Base for many months. Other manpower programs are stored in the QBE Data Base for a shorter period of time, then replaced by newer manpower programs.

QBE is a Data Base Management System (DMBS) that makes it relatively easy for the user to select various data items in the data base and to format reports on an ad hoc basis. The user may invoke the QBE software directly, in an interactive terminal session. The QBE software may also be invoked as part of the ELIM Information Selection and Graphics (ISG) Module.

The ISG Module is a major component of the FORECAST MIS. The FORECAST MIS is an evolving system that will ultimately contain information on total Army strength, gains, and losses (from ELIM-COMPLIP), on strength gains, and losses by MOS and grade (from the Enlisted MOS-Level System), on personnel authorizations, and on the Army manpower budget.

The Information Selection and Graphics Module is a user-oriented system for querying and graphing information generated by one or several runs of ELIM-COMPLIP. The user interacts with the ISG in a terminal session involving a series of full-screen displays. The user requests information and/or graphs from one or more manpower programs. The ISG programs invoke the QBE software to extract the required information from the QBE data base. The data may then be displayed in numeric form on the user's terminal, printed, or formatted into a graph. The graph may be displayed on a color graphics terminals or printed on a color graphics printer.

As mobilization features are added to other modules of ELIM-COMPLIP, it will be necessary to make corresponding changes to the RGM and MIS, in order to make the additional information readily available to the user. For example, when ELIM-COMPLIP is modified to provide separate accounting for Reserve and National Guard personnel called to active duty, the RGM and MIS will be modified to include this information. Similarly, when the system is modified to keep a separate account for personnel serving in a theater of conflict, and/or to keep a separate account for casualty losses, then corresponding changes will be required in the RGM and MIS. In general, special mobilization requirements for the RGM and MIS will simply be reflections of changes made in other modules of ELIM-COMPLIP.

4.3.2.2 MOSLS Postprocessor. The major impact of mobilization on the Postprocessor will be the breakouts of (a) loss projections to show the additional category of casualties, (b) gain projections to show RC personnel coming on active duty and returns to duty of WIAs and MIAs, and (c) projections for the shorter ELIM-COMPLIP time periods.

As indicated in the discussion of the Processor in Section 4.4.2.3, the projection models do not provide breakouts by component. It appears that a breakout of data such as MOS training requirements by component is not essental since all enlisted personnel, once activated, will be managed by FORSCOM/MILPERCEN without regard for component. However, if such a breakout should be deemed necessary, it will be accomplished in the Postprocessor with the use of data from ELIM-COMPLIP, where a breakout by component will be maintained.

4.3.3 Data Bases.

4.3.3.1 Starting Inventory (MT4MOB). This file will be a logical equivalent to the existing MT4 file. It will be created only when specific theaters of operation are defined. It will be a sequential, variable word length file on a USAMSSA 3350 disk. It will require approximately one cylinder. As many as five versions of this file might exist at a given time.

4.3.3.2 Reserve Tracking File (RTF). Under mobilization, a new longitudinal file will be created to track activated reservists and National Guard personnel in a manner similar to the way the current Small Tracking File tracks first-term enlistees and draftees. This file would be maintained on 6250 bpi tapes. Under full mobilization, this file will require one full length reel.

4.3.3.3 Other Existing Data Bases. Most internally generated data files in ELIM-COMPLIP will increase in size when required to support mobilization manpower planning. In particular, the following disk files at USAMSSA will increase in size by 20-30%:

- MT5
- MT6
- MT 16 and 17

In addition, most intermediate files generated by the Data Processor will increase similarly.

4.4 Program Descriptions

4.4.1 ELIM-COMPLIP. The following subsections provide specifications for the changes required in ELIM-COMPLIP by major module.

4.4.1.1 Data Processor Modules. Modifications to the Data Processor Modules will be required to support two general types of change--activation of the reserve, and accounting for CONUS personnel by overseas assignment availability.

For mobilization planning, there will be no reservists in the active inventory, so no accounting of strengths will be required. However, in an actual reserve mobilization, reservists will appear on both the EMF and GLF extracts. The Qualitative Data Processor will process these data and will maintain a tracking file for reservists similar to the Large and Small Tracking Files currently maintained for

no prior-service volunteers and draftees. The content of this Reserve Tracking File is outlined in the accompanying Data Requirements Document.

The Characteristic Group Designator (CGD) will be modified to accept reservists as a Major Category (similar to draftees, 2-year enlistees, etc. currently in the system). The user will have control over the minor categories which, in maximum disaggregation, would include up to eight categories of reservists based on the Personnel Mobilization Category Code as currently in the RC Composite File or such modifications of those codes as may be carried over into the EMF (note, however, that a special subset of the categories is assumed for application of tour area strength accounting; see sections 4.4.1.3 and 4.4.1.4). With this addition to the CGD and ultimately, to the Small Numeric Data Base (SNDB), the maximum minor categories for each major category would be:

- Reservists - 8 categories
- Draftees - 4 categories
- 2-Year Enlistees - 4 categories
- 3-Year Enlistees - 16 categories
- 4-Year Enlistees - 16 categories
- 5-Year Enlistees - 4 categories
- 6-Year Enlistees - 4 categories

The user will be able to control the number of minor categories for each major category, subject to some limitation on the total number of categories.

To provide accounting of overseas assignment availability data will be required in a modified file on MT4MOB, on CONUS enlistees by months since return from last overseas assignment, with a separate category for those not deployable for reasons other than time on CONUS. These data would be for each of the major personnel categories--draftees, first timers, careerists, and reservists (when present).

In addition, data on personnel (strengths in the overseas areas (as defined by the user) will be required in MT4MOB by months to ETS (months of service for reservists), by months of deployment, and by major personnel category, as defined above.

4.4.1.2 Rate Factor Generator Module. The Rate Factor Generator (RFG) is designed for arbitrary specification of the number of minor categories of personnel within each major category. The only changes required will be to modify the routines that write file headers so that the new reservist major category will be recognized when present, and the number of minor categories incorporated into the logic controls of the various programs. Incorporation of some new reserve-specific keywords in the user control processing routines will also be required.

4.4.1.3 Non-Prior Service Gains Module (NPSG). The NPSG is scheduled to be expanded to include a program to model the flow of personnel into and out of the DEP. It will provide data on projected DEP inventories by activation month. For mobilization purposes, this will be modified to permit the user to specify accelerations of the DEP activation process. This will lead to bounds in COMPLIP that reflect accelerated availabilities of NPS enlistees.

4.4.1.4 Inventory Projection Module (IPM). During a period of mobilization/demobilization, the enlisted population will be broken out in the IPM into theater(s) and non-theater, with the latter broken out further by those eligible and not eligible for deployment. Each of these arrays is discussed in the following subsections.

4.4.1.4.1 Theater Array. As of the end of each projection period, this array will contain the theater strength broken out by the following dimensions:

- Component/Category--i.e., AUS, RA first term, RA reenlistees/extendees, USAR except for the IRR, IRR, USANG, and other (e.g., recalled retirees and veterans).

- Months to ETS[1] for RA and month of enlistment/activation for all other components/categories.
- Month of deployment.

The population in the theater at the beginning of the mobilization will be input to the IPM. The following data will also be input:

- Projected strengths of ARNG and USAR units, with schedules for both activation and deployment to the theater.
- Projected total strength of the IRR available for activation.
- Projected total number in the "other" category available to be activated, and, if desired, the activation schedule.
- Projected annual and/or monthly ceilings on availability of volunteer recruits in the RA, for the total over all characteristic groups.
- If desired, the annual and/or monthly ceilings on draftees, for the total over all characteristic groups.
- Total monthly requirements for theater enlisted strength.
- Order of preference for deployment by component (except for the USANG and USAR units whose deployment schedule is specified).
- Policy with respect to length of tours in the theater.
- For each component, the required time for training prior to deployment. This can be specified in terms of a distribution.

During the projection, losses to the theater--i.e, administrative and casualty losses--will be computed using rates that are supplied to the IPM. Those casualties--i.e., WIAs and disease and non-battle injuries--who are losses to the theater but not losses to the Army will

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[1] If the mobilization calls for indefinite terms, the month of enlistment can be used for all RA personnel projected to be NPS gains during the forecast period and this dimension can be collapsed for all other RA personnel.

be added to the non-theater population who are not eligible for deployment. Depending on the specified policy with respect to theater tour lengths, there may be computation of losses to the theater for those who have completed tours. For this purpose the information in the strength data array concerning month of deployment and, depending on the specified policy, possibly also months to ETS or month of enlistment/activation will be used.

Following the computation of theater losses, gains to theater strength will be computed in order to meet the specified requirement. Data on order of preference for deployment, ceilings for the various sources of theater strength, distribution of required training time prior to deployment, and corresponding retention rates for non-theater populations will be used in the computation of gains to theater strength.

While the number of people in certain accession/activation cohorts--i.e., for the AUS, first term RA, IRR, and possibly the "other" category--will be determined by the COMPLIP solution subsequent to running the IPM, the projection of theater strength will be made in the IPM in terms of numbers of people. This is in contrast to the data array for non-theater population where certain cells will contain retention rates, rather than numbers of people. No problem with feasibility is anticipated as a result of specifying theater strengths in the IPM in terms of numbers of people for the following reasons:

- The computations in the IPM will be constrained by the ceilings on availabilty of personnel in the various components/categories.
- Constraints in COMPLIP will ensure that its solution is consistent with the IPM's projection of theater strength. (See Section 4.4.1.5.2.)

4.4.1.4.2 Non-Theater Arrays

4.4.1.4.2.1 Eligible for Deployment.[1] The following breakouts will be used:

- Component/Category--i.e., AUS, RA first term, RA reenlistees/extendees, USAR except for the IRR, ARNG, and other.
- Months to ETS for RA and month of enlistment/activation for all other components.
- Term of service for RA first term.
- Characteristic group for AUS and RA first term.
- If desired, length of service for RA reenlistees/extendees, as currently used in the IPM.

As indicated in the preceding subsection, some of the cells in this array will contain data representing strength counts and others--specifically, those corresponding to cohorts who are enlisted/activated during the period of projection--will contain retention rates. This is the procedure currently followed in the IPM; hence, the only required design modification for this array is the extension to include the Reserve Components and "other" personnel category.

The personnel projected to be on active duty at the beginning of the mobilization must be broken out with respect to deployment eligibility. It is anticipated that this breakout will be accomplished by means of factors derived from processing the EMF records of the starting inventory. Strength counts for those not eligible for deployment will be entered into the array described in the succeeding subsection.

4.4.1.4.2.2 Not Eligible for Deployment. The following breakouts will be used:

[1]As an exception to this heading, records of trainees are maintained in this array, though they are, of course, not eligible for deployment until they move from the status of trainees into that of trained strength.

- Component/Category--i.e., AUS, RA first term (except trainees), RA reenlistees/extendees, USAR, ARNG, and other.
- Months to ETS for RA and month of activation for all other components/categories.
- Permanently versus temporarily ineligible for deployment and, for the latter, the month of return from overseas.
- If desired, length of service for RA reenlistees/extendees.

All data in this array will represent numbers of people. As indicated previously in the discussion of the theater array, there will be gains to this array representing those casualties who are evacuated from the theater and, depending on the policies applicable to the mobilization, those who complete tours in the theater. Depending on the tour rotation policy, strengths corresponding to those who have been in CONUS long enough to become eligible for deployment will be subtracted from this array and added to the other non-theater array.

4.4.1.4.3 Comments Concerning Demobilization. In order for the IPM to handle demobilization, no basic change is needed in the structure of the data arrays discussed in the preceding sections. Rates must be provided to the IPM concerning the policies for deactivation of Reserve Component personnel and, if applicable, for (early) discharge of AUS and RA personnel. Once the period has passed where a breakout by theater is needed in order to implement discharge/deactivation policies, all data can be transferred to the non-theater arrays. Some of the details must be worked out for accounting for those in the theater array that correspond to cohorts represented by retention rates in the non-theater, deployment-eligible array. The same is true of those in the non-theater, not-deployment-eligible array, which need not be maintained as a separate array past the point where it is necessary to account for additional deployment to the theater.

4.4.1.4.4 Other Changes in the IPM. In addition to the theater area accounting defined in the previous sections, some other modifications will be required. The IPM must be reconfigured to permit efficient operation under the wide variety of scenarios that may arise. In general, this means reducing the dependence of the program on fixed

dimensions such as for months to ETS, months of deployment, and number of characteristic groups per term of enlistment. The main program must be modified to take better advantage of the parameter limits that are inherent in, or implied by, the particular scenario. Significant reductions in running time (and program size) can be achieved for some scenarios if the IPM can easily eliminate array dimensions that are not relevant to the scenario (e.g., multiple attrition loss types when theater losses will not be reported by cause; months of deployment for other than RAs, when tour length constraints are terminated).

One other significant change is required--because normal contractual term of service provisions may sometimes be terminated, it will be necessary to provide the capability to track personnel on active duty at M-day well beyond the current maximum of 7 months past ETS. To provide proper demobilization planning capabilities, it will be necessary to allow for these personnel to be "past due ETS" for as many months as the length of the mobilization (plus 7 months).

4.4.1.5 COMPLIP. The following subsections define additional and significantly modified constraints needed in order for COMPLIP to deal with mobilization.

4.4.1.5.1 Constraints on Availability of Accessions and Activations. In direct analogy with the current version of COMPLIP, the user will be able to specify constraints on annual availability and seasonal pattern, where applicable, or, optionally, the monthly availability of the following types of accessions/activations:

- Draftees by characteristic group, if desired. (Alternatively, there can be constraints imposed on monthly fluctuations in draft calls.)
- RA first term enlistees by characteristic group. (This is a current capability.)
- Activations of the IRR.
- Calls to active duty of retirees and veterans.

4.4.1.5.2 Constraints on Deployment. These constraints are needed in order to ensure that the solution values of the variables representing the various types of monthly accessions/activations listed in the preceding subsection are large enough to provide for the deployments projected in the IPM. In general, this is guaranteed to be the case because of the checks made in the IPM. (See the discussion of the computation of gains to the theater force in Section 4.4.1.5.1.) However, these COMPLIP constraints are needed, especially for the AUS and first term RA cohorts, since the COMPLIP variables representing these accessions and the IPM non-theater arrays containing the retention rates for these cohorts are broken out by characteristic group, while the theater populations from these cohorts are not borken out by characteristic group. Further contributing to the problem is the fact that peacetime loss rates, which are expected to form the basis of projecting losses during mobilization to non-theater personnel,[1] vary significantly by characteristic group, while losses to theater personnel during mobilization are not expected to be projected as a function of characteristic group.

The following constraints will be used (see Table 4.3 for definitions of the symbols):

$$\rho(c,\mu,\nu-1,q)\ A(c,\mu,q)$$

$$- \sum_{n=\mu}^{\nu-1} \frac{\rho(c,\mu,\nu-1,q)\ D(c,\mu,n)}{(c,\mu,n-1,q)}\ X(c,\mu,n,q)$$

$$- D(c,\mu,\nu)\ X(c,\mu,\nu,q) \geq 0$$ for each relevant combination of c, μ, q, and ν.

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[1]The current ELIM capability for user modification of historically derived loss rates will permit the user to introduce modification to these peacetime rates when deemed appropriate.

For the last value of q, designated q_ℓ, corresponding a given combination of c and μ, the form of the constraint is changed slightly by the substitution of

$$- \sum_{q=1}^{q_{\ell-1}} X(c,\mu,n,q)$$

for

$$X(c,\mu,n,q) \quad .$$

It will probably be adequate to formulate the constraint only for the largest value of ν corresponding to a given combination of c, μ, and q, rather than for each relevant value of ν, as indicated above.

In order to control the distribution of deployments from a given cohort across characteristic groups, it will undoubtedly be advisable to put lower (and possibly upper) bounds on the variables $X(c,\mu,n,q)$.

4.4.1.5.3 Equations for Total Enlisted Strength. Total enlisted strength during the periods when there is a breakout of theater strength can be computed by means of the following equation:

$$S(i) - \sum_{\substack{c,q \\ \nu=i}} \sum_{\mu=1}^{i} \left[\rho(c,\mu,\nu,q)\ A(c,\mu,q) \right.$$

$$\left. + \sum_{n=\mu}^{\nu} \frac{\rho(c,\mu,\nu,q)\ D(c,\mu,n)}{(c,\mu,n-1,q)}\ X(c,\nu,n,q) \right] = T(i)$$

TABLE 4.3

DEFINITIONS OF SYMBOLS

$\rho(c,\mu,\nu,q)$	Retention rate corresponding to non-theater populations at the end of month ν, where the population is of component/category c, cohort μ, and characteristic group q. These data are supplied by the IPM from data in the non-theater, deployment-eligible array.
$A(c,\mu,q)$	Number of accessions/activations of component/category c, cohort μ, and characteristic group q. These are variables whose solution values are determined by COMPLIP.
$D(c,\mu,\nu)$	Number deployed during month ν from component/category c and cohort μ. These data are supplied by the IPM from data used to update the theater array.
$X(c,\mu,\nu,q)$	Fraction of those deployed in month ν from component/category c and cohort μ who are of characteristic group q, where $\sum_q X(c,\mu,\nu,q) = 1$ and $0 \leq X(c,\mu,\nu,q) < 1$ for each combination of c, μ, ν, and q. These are variables whose solution values are determined by COMPLIP.
$S(i)$	Total enlisted strength at the end of month i. These are variables whose solution values are determined by COMPLIP.
$T(i)$	Total of the strength in all of the cells of the IPM data arrays that contain strength counts.

4.4.1.6 Report Generator and MIS.

Over the period October 1981 through March 1982, the ELIM-COMPLIP Report Generator Module (RGM) has been substantially modified, and RGM data have been stored into the new FORECAST Management Information System (MIS). Section 4.3.2.1, above, discusses the new data bases that have been created, and the flow of data in this part of the system (see Figure 4.6). The present section discusses the main computer programs involved, and outlines how these programs will have to be modified to provide mobilization information.

The discussion of computer programs is based on the various computation steps shown in Figure 4.6.

The first stage of processing (RGM Phase I) accomplishes most of the computation described in the formal documentation of the RGM (ELIM-COMPLIP System Documentation, Volume 2, June 1981). This stage involves two computer programs. The first is called SHAPE, and the second is the main RGM computational program. SHAPE simply assembles and reorganizes data from the COMPLIP solution and the COMPLIP Matrix Generator. The main RGM computational program combines the various retention rates computed by the Inventory Projection Module with the corresponding NPS accession levels determined by COMPLIP, to determine the projected numbers for Army strength, gains, and losses. This is a fairly complex computation, which is discussed in detail in the existing ELIM-COMPLIP System Documentation.

Volume 2 of the ELIM-COMPLIP System Documentation describes both the RGM computations and the production of the Active Army Military Manpower Program (AAMMP), as a single process. Figure 4.6 shows that this process has now been broken into two parts, called RGM Phase I and RGM Phase 2, with an intermediate data file coming between. This division of the RGM has been accomplished in a very straight forward

way. The basic approach is that all of the FORTRAN WRITE statements which formatted print lines for the AAMMP have been converted to unformatted binary WRITEs. The binary output does not always correspond line-for-line with the printed AAMAMP data, but the logical correspondence is very close.

For RGM Phase 2 processing, a set of binary READ statements have been constructed as mirror images of the Phase 1 WRITE statements. Then the previusly existing subroutines are used to format the printed tables that constitute the AAMMP.

This separation of the RGM into two phases yields two valuable advantages. First, it is now much easier to modify the tables in the AAMMP, because the RGM Phase 2 program is far simpler than the previous combined RGM program. Second, the RGM Intermediate File, which passes data from Phase 1 to Phase 2, provides the means of entering ELIM data into the FORECAST MIS.

Section 4.3.2.1 discusses the purpose and functions of the FORECAST MIS. The purpose of the present Section is to outline how ELIM-COMPLIP data are loaded into the MIS, and how the user can access this information.

After the RGM Phase 1 program has run, another FORTRAN program is run at USAMSSA to read the RGM Intermediate File, and to convert the binary data to character data in card-image format. This card-image data is then transmitted over the communications line to the IBM 4300 in the FORECAST Project Office. At this point, the Data Base Administrtor (DBA) for the FORECAST MIS Data Base must take action to complete the loading of the data. The MIS Data Base contains approximately 20 sets of tables. Each set has the same structure as all the others, and can hold RGM data for one manpower program. Thus, data for approximately 20 manpower programs can be kept on-line at any given time.

When data for a new manpower program becomes available, the DBA must decide whether it should be loaded into the data base. If all 20 sets of tables are full, the DBA must decide which old manpower program is to be dropped to make room for the new one.

After the DBA has decided which of the 20 sets of tables should hold the new data, another FORTRAN program reads the card-image RGM data and inserts all of the control information needed for loading into the QBE Data Base for the MIS. The DBA must then obtain exclusive control of the data base to complete the QBE load.

After loading is completed, the data base is available for user queries. The principal way of accessing this data base is through the MIS user interface program. This program shows the user a series of menu panels that list the information available in the data base. The Display Management System (DMS) software is used to control the menu panels. the user simply checks off the information that he wants to see. The user may choose either numeric information displays on his terminal, printed outputs, or graphical displays on a color graphics terminal. The Graphical Display Data Manager (GDDM) software is used to construct graphs. The user can easily request graphs that compare key variables in several alternative manpower programs. Graphs displayed on the terminals can also be printed on a color printer.

In summary, the MIS control program uses DMS software to manage the panels by which the user requests data. User requests are translated into queries to retrieve the data from the QBE data base. The data are then displayed in numeric form or graphed. The GDDM software is used to produce graphs.

4.4.1.7 Problem Formulator (PF). With the enhancements described above, the flexibility and power of ELIM-COMPLIP are greatly increased. These increases are obtained at the potential cost of increases in demands on the user to be able to take full advantage of the system's capabilities. To provide more help for the user, and to take advantage

of new software and hardware capabilities now available, an on-line problem formulator is already being developed under a separate contract.

This program, operating on the IBM 4300, using the Display Management System (DMS), will guide the user through the full spectrum of user specifications and controls necessary to take optimum advantage of the system capabilities. The PF will provide an interface with the APEX run stream management system operating on the USAMSSA main frames.

The ELIM-COMPLIP Runbook (Volume 13 of the System Documentation) provides a basic framework for the structure of the PF. The PF will guide the user through several sets of control specifications. The first set would be the basic run stream specifications--alternative titles, run stream identifiers, report labels, etc. The second set would be scenario-dependent policy parameters and other module-specific control information. Among these elements in a mobilization scenario would be:

- Projection time intervals
- M-day time specifications
- Historical time-series parameters
- "Stop loss" parameters
- CGD characteristic group alterations
- Deployability policy specifications
- Loss type specifications

The final set will include prompted access to the user control files that are required for all modules such as E4QFAC.DATA, E4IPM.DATA, and E4MGRAW.DATA, each of which contains specific data inputs or data modifications.

The segmenting of inputs defined for the PF will cause some modifications to the individual modules--some input parameters that are now in the same file as input data will probably be moved to separate files containing only parameter specifications and run stream controls.

Where on-line testing of control or input validity is possible (e.g., program INIT in the Rate Generator) the PF would immediately make the execution of the test program to identify errors or inconsistencies prior to incorporation in the batch run stream.

4.4.2 MOSLS. Descriptions of the enhancements to the Phase I MOSLS production system modules are provided in the following subsections.

4.4.2.1 Data Base Subsystem. This subsystem will have to be able to deal with the following new types of data: authorizations for USAR and USANG units, RC assets, and casualties. Each of these types of data is discussed in the corresponding subsection of Section 4.3.1.

4.4.2.2 Preprocessor. The major impact of mobilization on the MOSLS is in the area of loss projection. For the peacetime mode, the basic method by which this is accomplished is described iun Section 4.2.2.3.

For the mobilization mode, the normalization of MOSLS loss rates to force consistency between the loss projections of MOSLS and ELIM-COMPLIP will continue. However, since casualties will cause overall loss rates for some MOSs (e.g., the combat arms) to increase much more than for others, adjustment of the unnormalized rates will be required.

The projection models of the MOSLS make no distinction between operating strength and the other categories of trained strength--i.e., transients, holdees, and students. Hence, the only types of casualties with which the MOSLS rate generator must be provided loss rate projections are those that represent losses to the Army. However, the MOSLS Target Generator must increment the PERSACS-derived authorizations, which represent the desired operating strength broken out by MOS and grade, to account for the projected THS strength broken out by the same dimensions. Hence the Target Generator must account for the increases in the holdee account that result from those who are

projected to be wounded in action and those who are projected to be casualties due to disease and non-battle injuries.

4.4.2.3 Processor. Since, as indicated previously, it is not currently feasible for the MOSLS projection models to provide a breakout by component, it is not anticipated that operation in the mobilization mode will have any significant impact on the Processor Module other than the requirement to ensure that the Problem Formulator can handle all of the types of data discussed in the preceding subsection.

4.4.3 FORECAST Casualty Estimation Subsystem (FORECAST CES). The FORECAST CES will have the capability of providing detailed casualty/loss output data compatible for input into the ELIM-COMPLIP and MOSLS Systems. In order to do this, the subsystem must consider input data from two distinct points of view relative to methodology.

4.4.3.1 I - User Estimates Methodology. The operational concept of this method provides users with an interactive automated means of reviewing loss data based on specific wartime scenarios using cathode ray tube (CRT) screen displays. The methodology also provides the means for an action officer to make changes to casualty/loss estimates by changing the number of units in the theater and/or testing various loss factors. Users are required to select TO&E units by time period and assign those units to the Combat Zone (COMBAT-Z) or the Communications Zone (COMM-Z); users also select Zone Loss Ratios and assign Loss-Cause Factors (e.g., KIA, WIA, Admin, etc.). Multiple scenarios may be reviewed and considered.

The computer program, using programmed Functional Category (e.g., Infantry, Armor, etc.) Vulnerability Rates, and Enlisted MOS Loss Factors, provides detailed estimates of population and losses on CRT Data Displays for eighteen 10-day time periods. These data may be automatically converted to tape output compatible to the 30-day time periods used by the MOSL and ELIM-COMPLIP Systems.

4.4.3.2 II - Direct Conversion Methodology. At least annually, US Army Concepts Analysis Agency (CAA) provides detailed wargaming data on estimated casualty/losses for such analyses as the Operational Readiness Analysis (OMNIBUS) and the Total Army Analysis (TAA). The functioning methodology of the FORECAST CES described here is based upon receiving population and loss data from an existing wargame analysis. It is assumed that these analyses will use the methodology described in the CAA CES-I report. The CES-I methodology has the capability of providing the data required as input to the FORECAST CES. These data are produced for the most part by the CAA Wartime Requirements for Ammunition, Materiel, and Personnel (WARRAMP) system of models.

Certain data from the CES-I methodology, if provided on tape in the formats described, may be directly input into the FORECAST CES to be automatically converted to tape output compatible in format to data required by the MOSL and ELIM-COMPLIP Systems. Detailed population and loss data may also be displayed to the user via CRT terminal.

A simplified overview of the FORECAST Casualty Estimation Subsystem is shown in Figure 4.7.

4.4.4 Interim Reserve Component Strength Processor. For mobilization planning exercises, ELIM-COMPLIP and MOSLS both require time-phased projections of activated (or activatable) reserve personnel. The requirements for such data have been presented in Section 3.3.1 of the Functional Description. The time to improve existing reserve projection models, or to build new ones, is likely to be longer than the anticipated implementation time for other FORECAST enhancements presented in this document.

To ensure that some reasonable reserve strength projections are available for use in ELIM-COMPLIP and MOSLS when needed, an interim, simplified processor will be developed. This processor will operate

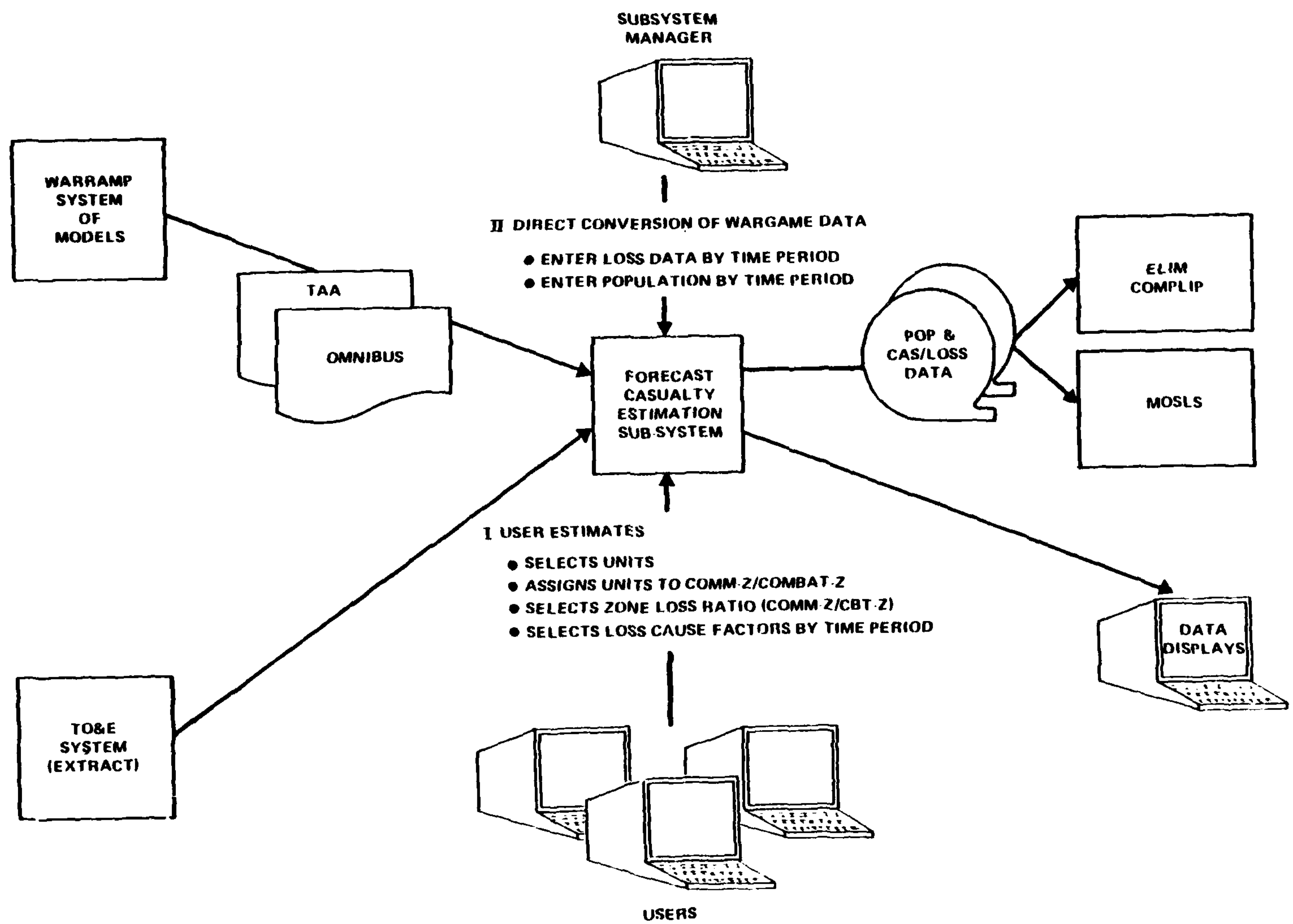

Figure 4.7. FORECAST Casualty Estimation Subsystem

directly on the MOBPERS RC Composite File, and will make no attempt to project these strengths forward in time--the strengths activatable at a future point in time will be those that are activatable now.

To determine reserve activation requirements for Selected Reserve and National Guard units, the processor will read from the PAM, the activation dates, by unit. The UIC/activation date pairs will then be used to define activatable personnel in MOBPERS, subject to the implementation of an approved yield rate methodology.[1]

Other, non-unit, reserve personnel will be assumed to be available for activation when needed (subject to the yield rate deflator). The processor will determine the number of personnel in each category in MOBPERS.

The output of this processor will be a file which contains estimated activatable strengths, broken out on the following parameters:

- Activation month
- Reserve personnel category
- MOS (including separate counts for untrained individuals)
- Grade

[1] The Yield Rate problem is discussed in Tab 4.

Tab 3

Data Requirements: Modifications To ELIM-COMPLIP and MOSLS for Mobilization Strength Planning and Management For Enlisted Personnel

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DATA REQUIREMENTS
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SECTION 1. GENERAL

1.1 Purpose of the Data Requirements Document. This Data Requirements Document (RD) for "Mobilization Planning Using FORECAST," prepared under Contract MDA903-81-C-0649, 29 September 1981, is written to provide detailed specifications for the changes in input data required to support the ELIM-COMPLIP and MOSLS enhancements defined in the accompanying Functional Description (FD) and System Specification (SS).

The sponsoring office for this project is the FORECAST Project Office in the Office of the Assistant Secretary of the Army (Manpower and Reserve Affairs). The Project Manager for FORECAST is COL E. R. Guthrie. The Contracting Officer's Representative (COR) is LTC James L. Jandreau.

Users of the products will be manpower resource managers at Headquarters, Department of the Army (HQDA), United States Army Military Personnel Center (MILPERCEN), and other Commands and Field Operating Agencies. Functional areas supported will include planning, programming, and budgeting; policy development; force development; and accessioning, training, and accounting for the enlisted force during simulated or actual mobilization.

The ADP and Telecommunications support will be provided by the United States Army Management Systems Support Agency (USAMSSA).

1.2 Project References. The references used during development of this RD are listed at Appendix C.

1.3 Terms, Abbreviations, and Acronyms. The definition of terms, abbreviations, and acronyms used in this document may be found in Appendix D.

1.4 Modification of Data Requirements. All changes to these data requirements will be fully coordinated with the sources of the data, the FORECAST Project Office and the development contractor.

1.5 Security and Privacy. Development of these enhancements can continue in an unclassified environment. Final system tests and ultimate operational use will probably require secure facilities because of the classified nature of reserve component activation schedules and of Army strength capabilities in mobilization requirements. This implies that most, if not all, user interaction with these systems will have to be through secure communication links to a computer systems approved for classified processing.

SECTION 2. DATA DESCRIPTION

2.1 Logical Organization of Static System Data.

2.1.1 Enlisted Master File (EMF). A tape extract of the month-end EMF is provided monthly to FORECAST by USAMILPERCEN. The format of this extract is shown in Table 2.1. Several new data elements will be required to be added to this extract to support FORECAST in mobilization mode. These new data elements are specifically defined at the end of Table 2.1.

2.1.2 DCSPER-46 (GLF). A tape copy of the GLF is provided monthly to FORECAST by USAMILPERCEN. The format of this extract is shown in Table 2.2. No change in this format is required for FORECAST in mobilization mode.

2.1.3 FORECAST CES Casualty Estimates. Data from a number of sources are required to provide factors as well as reference information for the user. Discussion of data sources and requirements is based on the recently published Casualty Estimation Study, Part I (CES-I), (December 1981) published by US Army Concepts Analysis Agency (CAA). CES-I provides an improved and standardized methodology for theater-level casualty estimation for a conventional warfare scenario. CES-I addresses three classes of casualties/losses:

- Battle Casualties
- Nonbattle Casualties
- Administrative Losses

CES-I addresses Battle Casualties by four areas (Main Battle Area, Division Rear, Corps Rear/COMMZ, and On/Over Ocean). In the interests of simplication, the FORECAST Casualty Estimation Subsystem (Enlisted) divides the theater into two areas for the placement of units for casualty estimation. These areas are:

TABLE 2.1

FORMAT OF THE EMF EXTRACT

Relative Position	Identification of Element (Field)	Abbreviation	Location	Location on Extract
2	Social Security Number	SSN	28-36	1-9
6	Sex of Service Member	Sex	40	10
18	Service Component	COMPT	65	11
5	Active-Inactive Indicator	RSCD	39	12
7	Race	Race	41	13
19	Term of Service	Terms	66	14
21	Delay in Separation Code	DSC	73	15
20	Date-Expiration Term of Service	ETSDT	67-72	16-21
26	YR-MO Basic Active Service DT	BASD	81-84	22-25
84	Type of Last Accession	TYPLA	239-240	26-27
85	Date of Last Accession	DATLA	241-244	28-31
27	Pay Grade	PATGR	85	32
123	YR-MO Began Cur. Oversea Tour	DCOST	351-354	33-36
	Blank			37-38
111	Date Elig. to Return from O/S	DEROS	325-328	39-42
110	Area of Current Foreign Tour	ACFST	324	43
	Blank			44-45
46	Assignment Code-Current	ASGTC	129-130	46-47
36	A.F. Qualif. Text %-ILE Score	AFQSC	109-110	48-49
48	Location Abbreviat.-Current	LOCNI	133-135	50-52
50	Academic Education Level	CIVED	137	53
13	Date of Birth (Year)	DOB	49-50	54-55
80	Duty MOS	DMOS	221-225	56-60
75	Primary MOS	PMOS	200-204	61-65
23	YR-MO Basic Pay Entry Date	DPEDT	75-78	66-69
47	Status Code-Current	STATU	131-132	70-71
198	Previous SSN	SSNPR	560-568	72-80
199	Control Date of Change	SNCTL	569-572	81-84
196	Date of Change	SSNDT	552-555	85-88
201	Top of System-Year	TOSYR	576	89
202	Top of System-Month	TOSMO	577	90
203	Top of System-Day	TOSDA	578	91
204	Top of System Transaction	TOSTT	579-580	92-93
31	Date of Rank	DOR	91-94	94-97
34	Type of Last Grade Change	GRDTT	101-102	98-99
35	Date of Last Grade Change	GRDDT	103-106	100-103
38	Language Identity	LANGS	113-114	104-105
40	NCO Education System	NCOES	116	106
41	Additional Skill Identif.	ADSID	117-118	107-108
42	Drill SGT Identification	SGTID	119-120	109-110
74	PMOS-How Acquired	PMOSH	199	111
76	Type Last Change of PMOS	PMOTT	205-206	112-113
77	Date Last Change of PMOS	PMODT	207-210	114-117
82	Promotion MOS	PRMOS	230-234	118-122

TABLE 2.1 (Cont.)

FORMAT OF THE EMF EXTRACT

Relative Position	Identification of Element (Field)	Abbreviation	Location	Location on Extract
83	Projected MOS Date (Reserv.)	PRJDT	235-238	123-126
115	Number Times Enlis/Reenlisted	PVSCI	337	127
158	Career Management Field	CMF	439-440	128-129
181	Progression MOS-PRI (Target)	PGMOS	501-504	130-133
1	Name, Individual	Name	1-10	134-143
10	Marital Status	MARST	45	144
11	Number of Dependents	NRDEP	46	
13	Date of Birth	DOB	49-54	1[illegible]51
32	Grade-Abbreviation	GRTIT	97-99	152-154
79	Secondary MOS	SMOS	216-220	155-159
122	Type Person. Security Invest.	SECLN	350	160
124	Combat Aptitude Score	COSCR	355-357	161-163
125	Field Artillery Score	FASCR	358-360	164-166
126	Electrical Aptitude Score	ELSCR	361-363	167-169
127	Operators & Food Servc. Score	OFSCR	364-366	170-172
128	General Maintenance Aptitude	GMSCR	367-369	173-175
129	Motor Maintenance Aptitude	MNSCR	370-372	176-178
130	Reenlistment Eligibility	EREUP	373	179
133	Selective Re-Up Bonus-MOS	VRPMO	379-381	180-182
134	Selective Re-Up Bonus-Grade	VRGRD	382	183
135	Selective Re-Up Bonus-Multipl	VRMUL	383	184

- -

NEW DATA ELEMENTS

Unit Processing Code	UIC
Data Returned From Last Overseas Assignment	DROS
Area of Previous Overseas Tour	APRAS
Assignment Eligibility Code	AEACD
Deployability Code	unk
Mobilization Personnel Category Code	PMC

TABLE 2.2a

FORMAT OF DCSPER-46 GAINS RECORDS

Relative Position	Identification of Element (Field)	Abbreviation	Location	Location on Extract
1	Name, Individual	NAME	10A	1-10
2	Career Code	CARCD	1	11
3	Current Assignment Code	ASGTC	2AN	12-13
4	Career Management Field	CMF	2A	14-15
5	DPA Code Sending	PPA	2AN	16-17
6	Blank		1	18
7	Service Number Prefix	SNPR	2A	19-20
8	Social Security Number	SSN	9N	21-29
9	Grade Abbreviation & Code	GRDCD	4AN	30-33
10	Month of Service for Pay Purpose	MOS-PAY	3N	34-36
11	Primary MOS	PMOS	5AN	37-41
12	RACE	RACE	1A	42
13	Service Component	SVC-COMPN	1A	43
14	Term of Service or Enlistment	TERMS	1N	44
15	Previous Command of Assignment	PRASGT	2AN	45-46
16	Blank		1	47
17	Blank		1	48
18	A-B Code (EMF Generated)	AB-CD	1	49
19	Moral Waiver	WAIVER	1N	50
20	MONS of Active Fed Svc CO-Gen	MFSV	2AN	51-52
21	ETS YR MO	ETSDT	4N	53-56
22	ETS Day		2N	57-58
23	Movement Designator Code	MDC	2AN	59-60
24	Reenlistment Bonus		1AN	61
25	Times Reenlisted		1N	62
26	Type Transaction	TT	2AN	63-64
27	Date Transaction YYMMDD	TRDY	6N	65-70
28	Ethnic Group	ETHGRP	1AN	71
29	ETS PETS CD-Generated	ETS-PTS	1N	72
30	Reception Station Enlist Code	REC-STA	1AN	73
31	Separation Prog No-Previous	SPNIS	3N	74-76
32	Process Date-Generated	PROCDT	4N	77-80
33	Category Code-Generated	CAT-CD	2A	81-82
34	Basic Active Service Date	BASDT	4N	83-86
35	Blank		2	87-88
36	Academic Education Level	DIVED	1AN	89
37	Mental Group	MENTG	1N	90
38	Armed Forces Qualif Test Scores	AFQT-SCORE	2N	91-92
39	Date of Birth YYMMDD	DOBDT	6N	93-98
40	Sex	SEX	1A	99
41	Blank		1	100
42	Project Ahead	PROJHD	1AN	101
43	Enlisted Options	ENLOP	4N	102-105
44	Basic Pay Entry Date	BPEDT	4N	106-109

TABLE 2.2a (Cont.)

FORMAT OF DCSPER-46 GAINS RECORDS

Relative Position	Identification of Element (Field)	Abbreviation	Location	Location on Extract
45	Dual Service Component Status	DUALS	1A	110
46	Special Personnel Category	SPCAT	1A	111
47	ETS of Last Period of Service	LAST-ETS	4N	112-115
48	Proficiency Pay	PRO-PAY	1N	116
49	Blank		2	117-118
50	Active Federal Service	AFS	3N	119-121
51	Marital Status		1AN	122
52	Number Dependents		1	123
53	Blank		4	124-127
54	Additional Pay Code	ADDPAY	1N	128
55	Blank		2AN	129
56	Segal Code-Generated	SEGAL	1A	130
57	PMOS Evaluation Score		3	131-133
58	Military Personnel Class	MPC	1A	134
59	CONUS O/S Code		1AN	135
60	Parent Unit and MRIC	UICCD	4AN	136-139
61	Subun (DD)	SUBUN	2AN	140-141
62	Status Code	STATUSX	2AN	142-143
63	Bonus MOS	BMOS	3AN	144-146
64	Previous UIC		3	147-149

TABLE 2.2b

FORMAT OF DCSPER-46 LOSS RECORDS

Relative Position	Identification of Element (Field)	Abbreviation	Location	Location on Extract
1	Name, Individual	NAME	10A	1-10
2	Career Code	CARCD	1	11
3	Current Assignment Code	ASGTC	2AN	12-13
4	Career Management Field	CMF	2A	14-15
5	DPA Code Sending	PPA	2AN	16-17
6	Blank		1	18
7	Service Number Prefix	SNPR	2A	19-20
8	Social Security Number	SSN	9N	21-29
9	Grade Abbreviation & Code	GRDCD	4AN	30-33
10	Month of Service for Pay Purpose	MOS-PAY	3N	34-36
11	Primary MOS	PMOS	5AN	37-41
12	RACE	RACE	1A	42
13	Service Component	SVC-COMPN	1A	43
14	Term of Service or Enlistment	TERMS	1N	44
15	Previous Command of Assignment	PRASGT	2AN	45-46
16	Eligibility to Reenlist	EREUP	2	47-48
17	A-B Code (EMF Generated)	AB-CD	1	49
18	Moral Waiver	WAIVER	1N	50
19	MONS of Active Fed Svc CO-Gen	MFSV	2AN	51-52
20	ETS YR MO	ETSDT	4N	53-56
21	ETS Day		2N	57-58
22	Movement Designator Code	MDC	2AN	59-60
23	Reenlistment Bonus		1AN	61
24	Times Reenlisted		1N	62
25	Type Transaction	TT	2AN	63-64
26	Date Transaction YYMMDD	TRDY	6N	65-70
27	Ethnic Group	ETHGRP	1AN	71
28	ETS PETS CD-Generated	ETS-PTS	1N	72
29	Reception Station Enlist Code	REC-STA	1AN	73
30	Separation Prog No-Previous	SPNIS	3N	74-76
31	Process Date-Generated	PROCDT	4N	77-80
32	Category Code-Generated	CAT-CD	2A	81-82
33	Basic Active Service Date	BASDT	4N	83-86
34	Blank		2	87-88
35	Academic Education Level	DIVED	1AN	89
36	Mental Group	MENTG	1N	90
37	Armed Forces Qualif Test Score	AFQT-SCORE	2N	91-92
38	Date of Birth YYMMDD	DOBDT	6N	93-98
39	Sex	SEX	1A	99
40	Blank		1	100
41	Project Ahead	PROJHE	1AN	101
42	Enlisted Options	ENLOP	4N	102-105
43	Basic Pay Entry Date	BPEDT	4N	106-109
44	Dual Service Component Status	DUALS	1A	110

TABLE 2.2b (Cont.)

FORMAT OF DCSPER-46 LOSS RECORDS

Relative Position	Identification of Element (Field)	Abbreviation	Location	Location on Extract
45	Special Personnel Category	SPCAT	1A	111
46	ETS of Last Period of Service	LAST-ETS	4N	112-115
47	Proficiency Pay	PRO-PAY	1N	116
48	Blank		2	117-118
49	Active Federal Service	AFS	3N	119-121
50	Marital Status		1AN	122
51	Number Dependents		1	123
52	Blank		4	124-127
53	Additional Pay Code	ADDPAY	1N	128
54	Blank		1AN	129
55	Segal Code-Generated	SEGAL	1A	130
56	PMOS Evaluation Score		3	131-133
57	Military Personnel Class	MPC	1A	134
58	CONUS O/S Code		1AN	135
59	Parent Unit and MRIC	UICCD	4AN	136-139
60	Subun (DD)	SUBUN	2AN	140-141
61	Status Code	STATUSX	2AN	142-143
62	Bonus MOS	BMOS	3AN	144-146
63	Previous UIC		3	147-149

- Combat Zone (Main Battle Area, Division Rear, Corps Rear)
- Communications Zone (COMMZ and On/Over Ocean)

2.1.3.1 Casualty Stratification Model (CSM). This model is part of the CAA WARRAMP system of models (WARRAMP: Wartime Requirements for Ammunition, Materiel, and Personnel) used to forecast Army requirements for nonnuclear ammunition, materiel, and personnel to fight a future conflict. Modifications and improvements to the CSM are described in detail in the CAA CES-I report on revised casualty estimation methodology. CSM is used to stratify gross numbers of theater level losses by rank and MOS. The FORECAST CES will utilize certain data from the CSM to support its methodologies for User Estimates and for Direct Conversion of wargaming data.

2.1.3.1.1 User Estimates Methodology. To support this methodology Vulnerability Rates for Functional Categories (e.g., Infantry Field Artillery, etc.) and MOS Loss Factors within Functional Categories as defined in the CES-I report will be programmed into the FORECAST Casualty Estimation Subsystem (FORECAST CES). In the interests of simplification, the FORECAST CES will not detail data to all Functional Categories.

Categories for which detailed population and casualty/loss data will be provided to MOS and Grade Level detail comprise 86.5% of the losses. Vulnerability rates express, as a percentage, the proportion of Battle Casualties distributed to a functional category.

Functional Category		Vulnerability Rate
Infantry		46.7%
Armor		17.8%
Field Artillery		10.5%
ADA		3.0%
Engineer		6.1%
Cbt Medic (MOS91B)		2.4%
	(Subtotal	86.5%)
Remaining categories are consolidated into		
All Other		13.5%
	TOTAL	100.0%

For the All Other Category, casualty/loss data will be distributed only to loss cause and not by MOS or grade.

MOS loss factors related to the six functional categories shown above will be used. These vulnerability rates will be applied in making User Estimates of losses. Loss factors express, as a decimal fraction, the proportion of casualties distributed by 3-digit MOS within a functional category.

2.1.3.1.2 Direct Conversion Methodology. When Direct Conversion of wargaming analysis data (e.g., OMNIBUS or TAA) is required for conversion to MOSLS and ELIM-COMPLIP compatibility, data directly from the CAA Casualty Stratification Model (CSM) may be fed into the FORECAST Casualty Estimation System. The CES-I report indicates that the CSM has the capability of providing loss data for a given scenario as follows:

Detailed MOS-Grade Data

- 10-Day Time Periods (WARMAPS System Compatible)
- 18 Time Periods
- MOS and Grade
- Number of Casualties in Period
- Rate of Casualties in Period-No/1000/day

Note: Population totals in the format shown above are also required. If not readily available for inclusion in the format, these data may be computed using the Rate and Number of Casualties for the period.

Total Theater Casualty Data. The CES-I report illustrates that total theater casualty and loss data in the format described below can be made available in support of wargaming analyses. The FORECAST CES requires data in the format described to compute net theater losses by 10 and 30 day time periods as follows:

- Battle Casualties
  - Killed in Action (KIA)
  - Captured/Missing in Action (CMIA)
  - Wounded in Action (WIA)
  - Returned to Duty from Hospital (RTD)
  - Died in the Hospital (DIED)
  - Evacuated from Theater (EVAC)
- Nonbattle Casualties
  - Diseased and Nonbattle Injuries (DNBI)
  - Returned to Duty from the Hospital (RTD)
  - Died in the Hospital (DIED)
  - Evacuated from Theater (EVAC)
- Administrative Losses

Data as described above, and as made available in such annual analyses as the Operational Readiness Analysis OMNIBUS, can also be of assistance to the User Estimates methodology. FORECAST CES users, in the absence of any better factors may calculate their own rates for Losses by Cause factors for input into the FORECAST CES.

2.1.3.2 TO&E System. Extracts from this system of all TO&E type units that may be deployed in the theater are required for the TO&E Input File for the FORECAST Casualty Estimation Subsystem to support User Estimates methodology. The TO&E Input File provides the basis for:

- User selection of number and type of TO&E units in the theater by time period; and, their placement in the Combat Zone or in the COMMZ.
- Computer program tally of all population at risk cells and their use in distribution of losses by grade and MOS.

The level of detail required for each TO&E is:

- Enlisted spaces by MOS and grade.
- Officer/Warrant Officer spaces as a total.

2.1.3.3 Patient Flow Model (PFM). Data input from PFM is required to support both the User Estimates and the Direct Conversion methodologies. This US Army Concepts Analysis Agency Model contributes to the WARRAMP System of models operated by the US Army Concepts Analysis Agency. The PFM simulates the flow of patients through the hospital system (admitted, treated, returned to duty, died in the hospital, and evacuated). It simulates inpatient flows through various echelons of the evacuation system to include level 3 (CONUS). Data relative to subsequent disposition of evacuees from the theater after they arrive in CONUS is required by the MOS Level and ELIM-COMPLIP Systems. The PFM produces data on the following from theater evacuee data by 10-day time periods:

- Patient Population
- Returns to Duty
- Deaths in Hospital
- Disability Separations

2.1.4. Reserve Component Strengths. The input data required will depend on whether a reserve strength projection system as defined in Section 3.3.1 of the Functional Description is implemented or there is only an interim interface with the MOBPERS RC Composite File as defined in Section 4.4.4 of the System Specification.

In the first case, ELIM-COMPLIP and MOSLS will require projected reserve component activatable strengths in a multi-dimensioned breakout as follows:

- By Reserve Category (PMC)
- By MOS (separately identifying numbers of untrained members)
- By Grade
- By Projection Month

If the interim method is used, monthly extracts of the MOBPERS RC Composite File and CCPAC Data Base will be required. The formats of these records are shown in Tables 2.3 and 2.4, with the data elements required for the extract noted.

2.1.5 MOB PERSACS. When a mobilization calls for the activation of USAR and/or USANG units, MOB PERSACS will provide input to the PAM in place of PERSACS. The capability will be there to perform all of the same types of user modifications and automated edits that are described in Section 4.2.2.2 of the System Specifications with reference to operation in a peacetime mode.

A new MOB PERSACS is produced about twice a year. In general, the data elements and formats are the same as for PERSACS, with the exception that there are some added data elements--e.g., a field for required wartime strength and a code that identifies positions that can be filled by retirees.

Additional information that must be included in the MOSLS Data Base for each USAR and USANG unit is the activation and deployment schedule. This information will be input via terminal by a designated user, the source being the Time-Phased Force Deployment List (TPFDL)[1] applicable to the specific mobilization for which a projection is to be made.

2.2 Logical Organization of Dynamic Input Data.

2.2.1 MT4MOB (Starting Inventory). To permit the IPM to account for projected strengths by deployed/non-deployed status, a modified

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[1] For each Army operation plan (usually geographically oriented, i.e., Europe, Middle East, Far East) there is a Time-Phased Force Deployment List (TPFDL) that tells which units will be deployed and when they will be deployed. Units contained in a TPFDL are generally both active and reserve units.

TABLE 2.3

MOBPERS RC COMPOSITE FILE

Relative Position	Identification of Element (Field)	Abbreviation	Length/ Class	Location
1	Social Security Number*	SSN	9N	01-09
2	Name, Individual	Name-Ind	27A	10-36
3	Military Personnel Class*	Mil-Pers-Class	1A	37
4	Grade*	Grade		
	a. Abbreviation		3AN	38-40
	b. Code		1A	41
5	Military Occupations:*			
	Officer			
	a. Specialty/Skill/Identifier	SSI	3AN	42-44
	b. Additional Specialty Identifier	ASI-1	2N	45-46
	Warrant Officer			
	a. Military Occupational Specialty	MOS	5AN	42-46
	Enlisted			
	a. Military Occupation	MOS	3AN	42-44
	b. Skill Level		1N	45
	c. Special Qualification Identifier		1A	46
6	Additional Skill Identifier*	ASI	2AN	47-48
7	Language Identifier Code*	Lang Ident	2AN	49-50
8	Physical Profile	Phys-Prfl-Ser	6N	51-56
9	Physical Category Code	Phys-Cat	1A	57
10	Unit Processing Code (UIC)*			
	a. Parent Unit Identifier	PUDDD	3AN	58-60
	b. Descriptive Designator		2AN	61-62
11	Security Clearance, Individual	Scty-Clnc-Stat	1A	63
12	Security Investigation Status	Pers-Scty-Inves-Stat	1A	64
13	Service Component*	SVC-Comp	1A	65
14	Sex*	Sex	1A	66
15	Race*	Race-Pop-Grp	1A	67
16	Verification Status SSN	VSSSN	1A	68
17	Date of Birth*	DOB	6N	69-74
18	Basic Branch (Officer/WO)	Basic-Br	2A	75-76
19	Marital Status*	Martl-Stat	1A	77
20	Number Dependents*	Nbr-Depn	1N	78
21	Ethnic Group*	Eth-Grp	1AN	79
22	Civilian Education Level*	Civ-Educ-Level	1AN	80
23	Major Subject of College Education	Maj-Subj-Coll-Educ	3A	81-83
24	NCO Education (Enlisted Only)	NCOES	1AN	84
25	Pay Entry Basic Date*	PEBD	6N	85-90
26	PMOS-How Acquired (Enlisted Only)	PMOSC-Enld Basis-Acq	1A	91

*Required in the FORECAST extract.

TABLE 2.3 (Cont.)

MOBPERS RC COMPOSITE FILE

Relative Position	Identification of Element (Field)	Abbreviation	Length/ Class	Location
	Blank	--	--	92
27	Record Status Code*	RCSD	1AN	93
28	PERSINS Processing Activity*	PPA	2AN	94-95
29	Religious Denomination	REL	2N	96-97
30	Secondary Specialty/MOS	SSSI-SMOS	5AN	98-102
31	Aviation Service Entry Date (Officer Only)	ASED	6N	103-108
32	ASI-2	ASI 2	2AN	109-110
33	Control Specialty (Officer Only)	CTSPEC	2N	111-112
34	ASI-3	ASI 3	2AN	113-114
35	PMC PERS MOB CAT Code*	PMC	1A	115
36	Filler	Filler		116-120

*Required in the FORECAST extract.

TABLE 2.4a

USAR UNIT PERSONNEL RECORD (RPIRS)

Data Elements Required for FORECAST

Relative Position	Identification of Element (Field)	Abbreviation	Location
1	Military Personnel Class	MPC	000-000
2a	Social Security Number	SSN	001-009
5	Date of Birth (Y-M-D)	DOB	038-043
6	Sex	SEX	044-044
7	Marital/Dependency Status	M-D	045-045
8	Race	RACE	046-046
9	Ethnic Group Code	ETHG	047-047
11	Civilian Education	C-E	050-050
13	Civilian Occupation	DOT	
	a. DOT Code	D-CD	052-057
	b. Critical/Foreman Code	D-CF	058-058
19	Address Validity Code & Date	AVCD	
	a. Code	AVC	120-120
	b. Date (Y-M-D)	AVD	121-126
20	Term of Service Obligation Code	SV-O	127-127
23	Expiration Term of Service (Y-M-D)	ETS	131-136
24	Date Eligible Transfer to Standby (Y-M-D)	DETS	137-142
25	Basic Pay Entry Date (Y-M-D)	BPED	143-148
27	Active Duty Training Status Code	ACD	155-155
28	Date Released from Active Duty (Y-M-D)	R-AD	156-161
34	Grade	GRD	
	a. Abbreviation	GABV	186-188
	b. Code	GRCD	189-189
36	Primary MOS (Enl or WO)	PMOS	196-200
37	Additional Skill Identifier	PASI/ASI1	201-202
48	Language Proficiency One	LP1	228-229
49	Language Proficiency Two	LP2	230-231
53	Processing Code (Parent Unit)	P-PC	239-242
54	Sub Unit (Parent Unit)	P-SU	243-244
57	Army Area/Command	ARMY	249-249
69	Total Satisfactory Years for Retirement	TYR	311-312
72	Separation Program Designator	SPD	339-341

TABLE 2.4b

USAR NON-UNIT PERSONNEL RECORD (TIRPERSINS)

Data Elements Required for FORECAST

Relative Position	Identification of Element (Field)	Abbreviation	Location
4	Social Security Account Number	SSAN	007-016
6	Grade	GRCH	
	a. Grade Code	GRCD	043-043
	b. Grade Abbreviations	GABV	044-046
7	Sex	SEXC	047-047
8	MPC	MPCD	048-048
9	Race	RACE	049-049
10	Ethnic Group	ETHG	050-050
11	Citizenship Status	CITZ	051-051
12	Marital Status	MARS	052-052
17	Civilian Education	CVED	067-067
18	Term of Service Code	TOSC	068-068
21	Language Proficiency	LANG	
	a. 1st	LAP1	073-074
	b. 2nd	LAP2	075-076
23	Address Validity Code	AVCD	120-120
28	Reason and Date Entered Present Category	RDEP	
	a. Reason Code	REPC	124-125
	b. Date Entered Code	DEPC	126-131
29	Active Duty Training Status Code	ADTC	132-132
37	Active Guard/Reserve Identifier	AGRI	143-143
41	Record Status Code	RESC	164-164
43	Critical Hardskill Indicator	CHSK	186-186
51-R	Mobilization Asset Code	MOAC	209-209
54-R	Disability Percentage	DPCT	212-213
56	Annual Training Status Code	ATST	227-227
60	Mobilization Designee Nominee	MDNC	232-232
61	MOB DES Assignment	MDAS	233-248
	a. Command Code	CMCD	
	b. UIC	MUIC	
	c. Paragraph Number	PARA	
	d. Line Number	LINE	
	e. Sequence Number	SEQN	
62	MOB DES TD Proponent Agency	AGCY	249-251
68-E	NCO Academy Graduate	NCOG	272-272
71-E	AFQT	AFQT	275-276
72-E	Waived Dependency/Critical Occupation	WDCO	277-277
81B	Religious Denomination	RELG	301-302
83	Term of Present Enlistment	TPEN	307
86	Date of Birth (YYMMDD)	DOFB	317-322
87	Pay Entry Basic Date (YYMMDD)	PEBD	323-328

TABLE 2.4b (Cont.)

USAR NON-UNIT PERSONNEL RECORD (TIRPERSINS)

Data Elements Required for FORECAST

Relative Position	Identification of Element (Field)	Abbreviation	Location
94	Address Validity Date (YYMMDD)	AVDT	361-366
95	Date ELIG to Transfer to Standby (YYMMDD)	DETS	367-372
97	Expiration Term of Service	ETSD	379-384
105	Number of Dependents	DEPN	412-413
106	Total Years Satisfactory Service for Retirement	TYSS	414-415
107	Paid Drill Status	PDST	416-417

starting inventory will be required. The ELIM-COMPLIP Data Processor Module must produce a starting inventory to be used as a reference inventory by the IPM. This file will be in the same general form as the current MT4, but will breakout the inventory by deployment status. The user will specify the deployment area(s) to be considered. Structurally, these data will be in place of the current reserved, but unused, records for Long and Short Tour and CONUS strengths in MT4.

2.2.2 Reserve Tracking File. In an actual mobilization, reservists data will appear in the EMF and GLF. To satisfy the data requirements of the remainder of the ELIM-COMPLIP system, it will be necessary to incorporate reservists data into the Small Numeric Data Base, as discussed in the SS. To support this requirement, a tracking file for reservists will be created and maintained. It will be in the same form as the existing Small Tracking File, and will contain the same data elements (though under wartime conditions, updating of some data elements in all these files will be suspended because of the reduced information available from SIDPERS-WT).

2.2.3 MOSLS Input Data from ELIM-COMPLIP. As discussed in Section 4.2.2.2 of the System Specifications, the MOSLS Projection Interface Subsystem creates a file of data from ELIM-COMPLIP that is used to ensure that the projections of the MOSLS are consistent with the more aggregate projections in a specified AAMMP alternative produced by ELIM-COMPLIP.

In addition to the types of data listed in the referenced section that are needed for peacetime projections, the following are needed for the mobilization mode:[1]

[1]Whether the listed data are required to be broken out by component/category depends on whether it is determined to be necessary for the MOSLS projections to be broken out by this dimension. See Section 4.3.2.3 of the System Specifications.

- Activation schedules for each component/category.
- Theater strength at the end of each period for which this breakout is maintained, with the strength broken out by component/category.
- For each period for which casualties are projected, the projected losses broken out by loss category, component, and theater versus non-theater.
- During demobilization, the number released from active duty in each period, broken out by component/category.

2.2.4 FORECAST CES Casualty Estimates. Both the User Estimates and Direct Conversion methodologies provide for a user interface with the subsystem by means of an interactive CRT terminal; and capability to produce ELIM-COMPLIP and MOSL compatible tape output. In addition to providing a means for user input to the subsystem, some of the CRT screens also display data computed by the interactive program. Access to user input displays, as well as all informational displays in the subsystem, is through an option list.

2.2.4.1 Option List. Regardless of methodology in use, this CRT display will provide an index to various data displays available for user input or review of enlisted population and casualty/loss data. The user selects one of multiple scenarios to work with on the interactive system.

2.2.4.2 User Estimates Methodology. The User Estimates methodology requires user interface with the FORECAST CES by means of an interactive CRT terminal. The user is required to provide input to four interactive CRT screen displays:

- Option List: Index to Displays and Instructions
- A1: Theater Army Troop List
- B: Zone Loss Distribution - Battle Casualties
- C-HELP: Loss Cause Factor-HELP
  (Optional Use)
- C: Enlisted Loss-Cause Factors
  (User option of direct input or use C-HELP display)

2.2.4.2.1 Theater Army Troop List (Screen A-1). This CRT display provides the user with the means of determining the population at risk by time period. Type TO&E units available are displayed on this multi-page display. The user is required to enter the number of each type unit deployed in the Combat Zone (defined as Main Battle Area, Division Rear, and Corps Rear) and the Communication Zone respectively. These unit distributons must be entered for each of the eighteen 10-day time periods. The interactive program then computes and displays for each type of unit the totals for the enlisted population by functional categories (Infantry, Armor, etc.) for the theater. Additionally, the internal program computes and displays data on two display screens of enlisted population by functional category:

Screen A-2 Communications Zone Troop List
Screen A-3 Combat Zone Troop List

Figure 2.1 illustrates the notional concept of these theater Army displays.

2.2.4.2.2 Zone Loss Distribution - Battle Casualties (Screen B). This CRT display (see Figure 2.2) requires user input for each time period. The user is required to enter his estimate of the ratio distribution for Battle Casualties between the Combat Zone and the Communications Zone. Provision is made in the procedure to make only one entry by the user if the ratio distribution is to remain the same for all time periods. Non-Battle Casualties and Administrative Losses are automatically distributed by the computer program to the Combat and Communications Zones by a ratio of the population at risk in each zone for each time period.

2.2.4.2.3 Loss Cause Factor-HELP (Screen C-HELP). This optional CRT display (see Figure 2.3) is a user input screen and is designed for users who desire to utilize existing theater data from a recent wargaming analysis (e.g., OMNIBUS) to provide the basis for calculation of Loss Cause Factors to be used in the computer program to compute

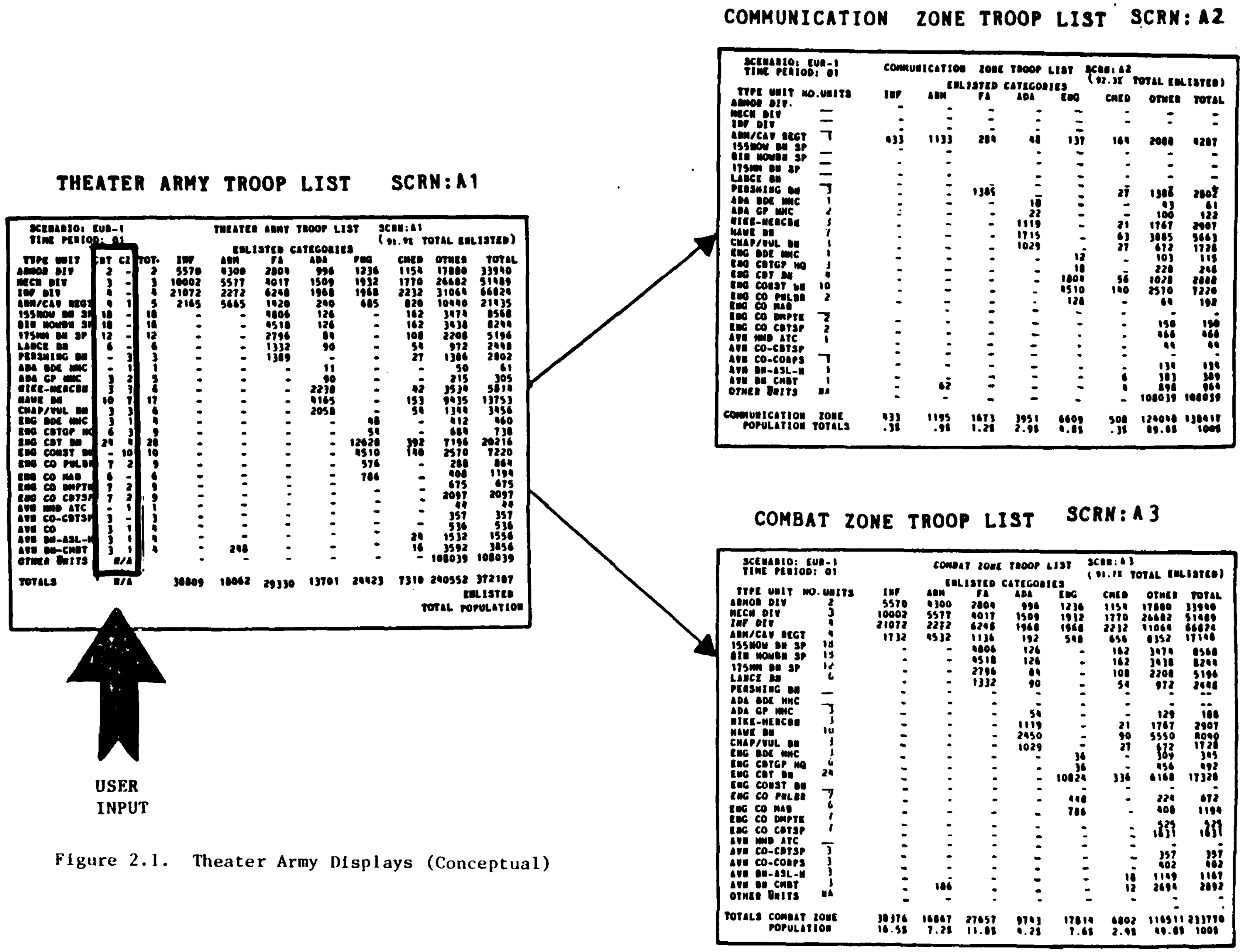

Figure 2.1. Theater Army Displays (Conceptual)

```
SCENARIO:EUR-1   FORECAST CASUALTY ESTIMATION SUBSYSTEM  SCRN:B     (12/20/82)
             ZONE LOSS DISTRIBUTION-BATTLE CASUALTIES
 TIME    COMM      COMBAT   :  TIME    COMM      COMBAT
 PER     ZONE      ZONE     :  PER     ZONE      ZONE       :: NOTE ::
  1      .04       .96      :  10      ._        ._         FOR EACH TIME
  2      ._        ._       :  11      ._        ._         PERIOD THE
  3      ._        ._       :  12      ._        ._         COMMZ + CBTZ
  4      ._        ._       :  13      ._        ._         MUST EQUAL 1.00
  5      ._        ._       :  14      ._        ._
  6      ._        ._       :  15      ._        ._
  7      ._        ._       :  16      ._        ._
  8      ._        ._       :  17      ._        ._
  9      ._        ._       :  18      ._        ._

   IF FACTORS SAME FOR ALL TIME PERIODS
   ENTER FACTORS BELOW :

                    COMM ZONE    : ._
                    COMBAT ZONE  : ._


X..TO UPDATE REPLACE X WITH U, N OR T
```

Figure 2.2. Zone Loss Distribution Battle Casualties

```
SCENARIO:EUR-1   FORECAST CASUALTY ESTIMATION SUBSYSTEM   SCRN:C-HELP (12/20/82)
                          LOSS FACTORS HELP               PAGE 2 OF 2 PAGES
              PER-10 PER-11 PER-12 PER-13 PER-14 PER-15 PER-16 PER-17 PER-18
 THTR POP     000000 000000 000000 000000 000000 000000 000000 000000 000000
```

```
SCENARIO:EUR-1   FORECAST CASUALTY ESTIMATION SUBSYSTEM   SCRN:C-HELP (12/20/82)
                          LOSS FACTORS HELP               PAGE 1 OF 2 PAGES
              PER-1  PER-2  PER-3  PER-4  PER-5  PER-6  PER-7  PER-8  PER-9
 THTR POP     000000 000000 000000 000000 000000 000000 000000 000000 000000
 BATTLE CAS
     KIA      000000 000000 000000 000000 000000 000000 000000 000000 000000
     CMIA          0      0      0      0      0      0      0      0      0
     EVAC          0      0      0      0      0      0      0      0      0
     DIED          0      0      0      0      0      0      0      0      0
     RET DY        0      0      0      0      0      0      0      0      0
 NON-BATTLE
     DNBI          0      0      0      0      0      0      0      0      0
     DIED          0      0      0      0      0      0      0      0      0
     EVAC          0      0      0      0      0      0      0      0      0
     RET DY        0      0      0      0      0      0      0      0      0
 ADMIN        5.6024 LOSSES/1000 AVG MONTHLY POPULATION WILL BE USED



X..TO UPDATE REPLACE X WITH U, N OR T
```

Figure 2.3. Loss Factors Help Display

loss estimates. When Screen C-HELP is used to enter data, a computer program automatically computes the Enlisted Loss Cause Factors to be utilized by the subsystem program in distribution of casualty and loss estimates. The computed factors are automatically displayed on a CRT display (Screen C).

2.2.4.2.4 Enlisted Loss Cause Factors/1000 Population (Screen C). The FORECAST CES methodology provides that the factor entries for this display (see Figure 2.4) may be computed and entered automatically as explained in the preceding subparagraph describing the Loss Cause Factor-Help display; or, in the event the user wishes to test the results of using his own derived factors, they be be entered into the program manually through this display. In the manual entry mode for this display, the user must enter estimated loss rates/1000 population in the theater for the following causes of casualties/losses:

- Battle Casualties
  - Killed in Action (KIA)
  - Captured/Missing in Action (CMIA)
  - Died in Hospital of Wounds (DIED)
  - Wounded Evacuated from the Theater (EVAC)
  - Wounded Remaining in Hospital (WIA)
- Non-Battle Casualties
  - Died in Hospital (DIED)
  - Evacuated from the Theater (EVAC)
  - Remaining in Hospital (HOSP)

Administrative losses will be automatically calculated using the rate of 5.6 Losses/1000 Average Monthly Strength. This rate is based on that rate developed by US Army Soldier Support Center for the Casualty Estimation Study - Part I (published by CAA in December 1981).

2.2.4.3 Direct Conversion Methodology. This methodology is used for direct conversion of a specific wargaming analysis (e.g., OMNIBUS) into

```
SCENARIO:EUR-1   FORECAST CASUALTY ESTIMATION SUBSYSTEM  SCRN:C     (12/20/82)
                     LOSS CAUSE FACTORS/1000 POPULATION
 TIME                  BATTLE                          NON-BATTLE            ADMIN
  PER    KIA   CMIA   DIED   EVAC    WIA   :  DIED   EVAC   HOSP   :  5.6024 PER 1000
    1  .0000  .0000  .0000  .0000  .0000   : .0000  .0000  .0000   :   AVG MONTHLY
    2      0      0      0      0      0   :     0      0      0   :   POPULATION
    3      0      0      0      0      0   :     0      0      0   :   CALCULATED
    4      0      0      0      0      0   :     0      0      0   :   FOR ALL TIME
  . 5      0      0      0      0      0   :     0      0      0   :   PERIODS
    6      0      0      0      0      0   :     0      0      0   :
    7      0      0      0      0      0   :     0      0      0   :
    8      0      0      0      0      0   :     0      0      0   :
    9      0      0      0      0      0   :     0      0      0   :
   10      0      0      0      0      0   :     0      0      0   :
   11      0      0      0      0      0   :     0      0      0   :
   12      0      0      0      0      0   :     0      0      0   :
   13      0      0      0      0      0   :     0      0      0   :
   14      0      0      0      0      0   :     0      0      0   :
   15      0      0      0      0      0   :     0      0      0   :
   16      0      0      0      0      0   :     0      0      0   :
   17      0      0      0      0      0   :     0      0      0   :
   18      0      0      0      0      0   :     0      0      0   :
ENTER KEY FOR NEXT DISPLAY
```

Figure 2.4. Loss Cause Factors/1000 Population

ELIM-COMPLIP and MOSL Systems data input. Informational data on the input data is also displayed on the CRT. The user is required to provide input to two interactive CRT screen displays:

- Option: List Index of Displays and Instructions
- C-Help: Loss Cause Factor-Help

Additionally, an input tape using CES-I methodology and format is required with data on:

- Theater Casualties (MOS and Grade)

2.2.4.3.1 Loss Cause Factor-Help (Screen C-Help). This display is explained in paragraph 2.2.4.2.3. The data entered is obtained from the wargaming analysis being converted. The CAA CES-I report, in its discussion of CES-I methodology, indicates that the CSM report generator has the capability to produce data in the required format. See paragraph 3.1.3 for a discussion of Losses by Cause by Time Period. When the required data is provided on tape, it can be fed directly into the FORECAST CES to be converted to appropriate Loss Cause Factors/1000 population and displayed on Screen C described above.

2.2.4.3.2 Theater Casualties (MOS and Grade). This detailed data is required from any wargaming analysis as a tape input. Paragraph 3.1.1.4 below discusses the requirement. Format of the data:

- Time Period 10 days (18 Periods)
- MOS (3 Digits)
- Grade (1 Digit)
- Casualties
- Casualty Rate/1000/Day

2.2.4.4 Status of Theater Evacuees. Information on the disposition of theater evacuees in the CONUS hospital system is required to complete the requirements for ELIM-COMPLIP and MOSL systems compatible data. This data is required from any wargaming analysis as a tape input to support the Direct Conversion methodology (see paragraph 3.1.1.5). Data from the latest wargame analysis will be used in the User Estimates methodology to provide factors as a basis for CONUS distribution. Format of the data:

- Time Period - 10 days (18 periods)
- Patient Population (from Theater Evacuation)
- Returns to Duty
- Deaths in Hospital
- Disability Separation

2.3 Logical Organization of Dynamic Output Data.

2.3.1 ELIM-COMPLIP Dynamic Output Data. Until recently, the only major output of ELIM-COMPLIP has been the Active Army Military Manpower Program (AAMMP). This is a printed report giving detailed information on Army strength, gains, and losses for one run of the ELIM-COMPLIP system. Information is presented in the form of numeric tables. The report usually begins with a few summary tables comparing the current run with previous runs in terms of aggregate statistics such as total manyears and total estimated personnel costs. Then come a series of tables giving detailed information about projections of strength, gains, and losses for this ELIM-COMPLIP run. Figure 2.5 is a table of contents for a typical AAMMP. The ELIM-COMPLIP Executive Briefing, enclosed as an Appendix to this report, gives examples of the different types of tables that appear in the AAMMP. More detailed information is provided in Volumes 1 and 2 of the ELIM-COMPLIP System Documentation.

The user can exercise some limited controls over how much detailed information should be printed, and over which previous runs should be

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C O N T E N T S

Figure 2.5. Contents Page

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selected for summary comparisons with the current run. In general, however, the format of the AAMMP changes very little from run to run.

A recent major addition to the ELIM-COMPLIP System is an executive-level Management Information System (MIS). This MIS is still at an early stage of development, but it may be described in general terms as follows.

At the center of the MIS is a data base, controlled by the Query By Example (QBE) Data Base Management System (DBMS). This data base contains data for a number of ELIM-COMPLIP runs (approximately 20). At the present stage of system development, the information stored for a given run is essentially the same information printed in the AAMMP. In the future, additional information will be included.

The user can select the information he wants from a series of menu panels, presented in an interactive terminal session. The MIS control program then accesses the QBE data base, retrieves the information, and displays it on the user's terminal, either in numeric form or as a graph. The Graphical Display Data Manager (GDDM) software is used to generate the graphs.

The MIS gives the user extensive capabilities to compare two or more alternative manpower programs at several different levels of detail.

The information in the QBE data base is organized according to the same general concepts familiar to users of the AAMMP. Data from a given run of ELIM-COMPLIP is loaded into a set of QBE tables. The data base contains approximately 20 sets of tables, all with identical structure, and hence can hold data for approximately 20 ELIM-COMPLIP runs.

For each set of tables, the names of the tables correspond closely with the names of the various subsections of the AAMMP (e.g., CHART 1,

CHART 4.2, CHART 10). The columns of the tables have names that correspond to the various types of strength, gains, and losses shown in the AAMMP (e.g., TOTAL STRENGTH, OPERATING STRENGTH, NPS GAINS, etc.). The tables contain one row for each month of projection; thus, a table usually contains 84 rows of data. Each table contains one special column, called FDATE, which contains the dates for each row, in the form YYMM, where YY is the fiscal year and MM is the month within the year (01 through 12).

As mobilization features are added to ELIM-COMPLIP, the new information generated will be displayed in the AAMMP and added to the MIS data base.

2.3.2 MOSLS Dynamic Output Data. The design of the production version MOSLS output modules (MOSLS Post Processor) has not been completed at this time. A description of MOSLS dynamic output data will be provided after the necessary design work has been completed.

2.3.3 FORECAST Casualty Estimation.

2.3.3.1 Detailed Population and Loss Data. This information is automatically derived based on user input described above under the Direct Conversion and the User Estimates methodologies. The notional information displays described below are automatically posted by the interactive computer program. Screen layout is as follows:

- Display C01 through C07 Population and Loss by Cause for Functional Categories by 10-day time periods.
  - 1 = Infantry
  - 2 = Armor
  - 3 = Field Artillery
  - 4 = Air Defence Artillery
  - 5 = Engineer
  - 6 = Combat Medic (MOS 91B)
  - 7 = All Other

- Display C08 Summary of Losses by Cause (C01 through C07)
- Display C09 Summary of Population (C01 through C07)
- Display C10 Summary of Population by Functional Category (C01 through C07)

Figure 2.6 illustrates data display relationships as well as data formats which are possible.

Detailed loss data is also automatically calculated and may be called up for CRT display. Detailed MOS displays and their relationship to the C01 through C10 displays are shown in Figure 2.7. Screen layout is as follows:

- Display C11 Summary of Population and Loss Data by MOS/Grade by Time Period.
- Displays C21 through C26 Functional Category Summary of Population and Loss Data by MOS/Grade by Time Period.
  - 21 = Infantry
  - 22 = Armor
  - 23 = Field Artillery
  - 24 = Air Defense Artillery
  - 25 = Engineer
  - 26 = Combat Medic (MOS 91B)

Detailed MOS Data Displays provide population and loss data to MOS and grade level of detail. A C01 (Infantry) category screen display is shown as a basis for showing the data relationship to the screen displays for MOS and grade level data.

- The C11 screen displays a detailed listing, for one specified time period of all MOS and grades represented by the six functional categories of enlisted personnel in the Theater Army. Population and Net Loss for each MOS in the designated time period are shown. All detailed information on this display is automatically posted from data displayed

ENLISTED

C10

SCENARIO:EUR-1 FORECAST CASUALTY LOSS MODULE SCRN:C10 (12/20/82)

POPULATION BY CATEGORY

TIME	INF	ARM	FA	ADA	ENG	CBT-MED	OTHER	TOTAL
1	38809	18062	29330	13694	24423	7310	240559	372187

C09

SCENARIO:EUR-1 FORECAST CASUALTY LOSS MODULE SCRN:C09 (12/20/82)

LOSSES BY CATEGORY--ENLISTED

TIME	INF	ARM	FA	ADA	ENG	CBT-MED	OTHER	TOTAL
	5283	1743	1144	327	664	153	1576	10890

C08

SCENARIO:EUR-1 FORECAST CASUALTY LOSS MODULE SCRN:C08 (12/20/82)

LOSSES: TOTAL LOSSES

TIME	POP TOTAL	DIED	CMIA	WIA	EVAC	DNBI	ADMIN	LOSS TOTAL
1	372187	1471	491	4925	2917	1067	8	10890

C01

SCENARIO:EUR-1 FORECAST CASUALTY LOSS MODULE SCRN:C01 (12/20/82)

LOSSES: INFANTRY

TIME	POP TOTAL	DIED	CMIA	WIA	EVAC	DNBI	ADMIN	LOSS TOTAL
1	0038809	713	238	2388	1415	518	5	5283
2	0044100	810	270	2714	1607	589	6	6003
3	0049855	916	306	3068	1817	666	6	6786
4	0057525	1057	353	3540	2097	768	7	7831
5	0067112	1233	411	4130	2446	896	9	9135
6	0076700	1409	470	4720	2796	1024	10	10441
7	0000000	0	0	0	0	0	0	0
8	0000000	0	0	0	0	0	0	0
9	0000000	0	0	0	0	0	0	0
10	0000000	0	0	0	0	0	0	0
11	0000000	0	0	0	0	0	0	0
12	0000000	0	0	0	0	0	0	0
13	0000000	0	0	0	0	0	0	0
14	0000000	0	0	0	0	0	0	0
15	0000000	0	0	0	0	0	0	0
16	0000000	0	0	0	0	0	0	0
17	0000000	0	0	0	0	0	0	0
18	0000000	0	0	0	0	0	0	0

ENTER KEY FOR NEXT DISPLAY

Figure 2.6. Data Display Relationships

ENLISTED

C11

SCENARIO:EUR-1 FORECAST CASUALTY LOSS MODULE SCRN:C11 [illegible]
TIME PERIOD-01 LOSS RATE DATA BY MOS - ENLISTED PAGE: 1 OF 6 PAGES

MOS	POPULATION	LOSSES	MOS	POPULATION	LOSSES
11B E3/4	19404	2324	12C E5	[illegible]	[illegible]
11B E5	3880	[illegible]	12C E6	[illegible]	[illegible]
11B E6	3492	633	12C E7	[illegible]	3
11B E7	2328	343	12E E3/4	[illegible]	3
11B E8	776	163	12E E5	49	1
11C E3/4	3880	538	12E E6	48	1
11C E5	1164	174	12E E7	[illegible]	0
11C E6	388	47	12F E3/4	366	8
11C E7	388	47	12F E5	122	2
11H E3/4	2134	359	12F E6	97	2
11H E5	388	63	12F E7	24	0
11H E6	388	63	12Z E8/9	561	14
11H E7	194	15	13B E3/4	15134	557
12B E3/4	12699	350	13B E5	1847	65
12B E5	3663	100	13B E6	1495	72
12B E6	2320	59	13B E7	586	29
12B E7	1221	33	13C E3/4	322	1
12C E3/4	2442	67	13C E5	117	1

ENTER PN OR KEY FOR NEXT DISPLAY

C21

SCENARIO:EUR-1 FORECAST CASUALTY LOSS MODULE SCRN:C21 (12/20/80)
TIME PERIOD-01 ENLISTED - LOSS BY CATEGORY - INFANTRY PAGE: 1 OF 3 PAGES

MOS	GRADE	POPULATION	% INF LOSSES	LOSSES
11B	E3/4	19404	44.0	2324
11B	E5	3880	09.6	507
11B	E6	3492	12.0	633
11B	E7	2328	06.5	343
11B	E8/9	775	03.1	163
11C	E3/4	3880	10.2	538
11C	E5	1164	03.3	174
11C	E6	388	00.9	47
11C	E7	388	00.9	47
11H	E3/4	2134	06.8	359
11H	E4	388	01.2	63
11H	E5	388	01.2	63
11H	E6	194	00.3	15
—	—	0	00.0	0
—	—	0	00.0	0
—	—	0	00.0	0
—	—	0	00.0	0
TOTALS		38809	100.0%	5283

ENTER PN OR KEY FOR NEXT DISPLAY

C01

SCENARIO:EUR-1 FORECAST CASUALTY LOSS MODULE SCRN:C01 (12/20/80)
LOSSES: INFANTRY

TIME	POP TOTAL	DIED	MIA	WIA	EVAC	DNBI	ADMIN	LOSS TOTAL
1	0038809	713	238	2388	1415	518	5	5283
2	[illegible]	810	270	2714	1607	559	6	[illegible]
3	0049855	916	306	3068	1817	566	6	[illegible]
4	0057525	1057	353	3540	2097	758	7	7931
5	0067112	1233	411	4130	2446	896	9	[illegible]
6	0076700	1409	470	4720	2796	1024	10	[illegible]
7	0000000	0	0	0	0	0	0	0
8	0000000	0	0	0	0	0	0	0
9	0000000	0	0	0	0	0	0	0
10	0000000	0	0	0	0	0	0	0
11	0000000	0	0	0	0	0	0	0
12	0000000	0	0	0	0	0	0	0
13	0000000	0	0	0	0	0	0	0
14	0000000	0	0	0	0	0	0	0
15	0000000	0	0	0	0	0	0	0
16	0000000	0	0	0	0	0	0	0
17	0000000	0	0	0	0	0	0	0
18	0000000	0	0	0	0	0	0	0

ENTER KEY FOR NEXT DISPLAY

Figure 2.7. Detailed MOS Data Displays

on category screens C21 through 26 for each time period. The ALL OTHER category Loss Total from screen display C09 and the ALL OTHER category Population Total from screen display C10 are shown at the end of the detailed MOS information. Inclusion of the ALL OTHER category figures allows for grand total population and grand total loss figures to be computed as a cross-check of data shown on displays C08, C09, and C10.

- The C21 (Infantry) CRT display exmaple represents the format for each of the six specified category displays, showing by time period. (NOTE: Some of these six display require multi-page screens to accommodate the MOS/Grade listing.)
  - Category MOS and Grade detail for population and for losses.
  - Total category population and total category losses.

Detailed data from these six category screens is automatically transferred to the C11 CRT display as already explained above.

2.3.3.2 MOSL and ELIM-COMPLIP Input Data. Once the user has placed the required inputs into the FORECAST CES, regardless of whether he uses the Direct Conversion or the User Estimates methodology, the computer program will also automatically update appropriate record formats for input to the two systems. The computer program automatically distributes the MOS/Grade loss data, illustrated in paragraph 2.3.3.1 above, to losses by cause while converting the data to 30-day increments. Figure 2.8 below illustrates a notional view of a section of a report printed from the FORECAST CES output as a sample of ELIM-COMPLIP and MOSL input format.

SCENARIO:EUR-1

FILE FROM FORECAST CASUALTY ESTIMATION SUBSYSTEM
LOSS PROGRAM FOR USE BY ELIM-COMPLIP SYSTEM

TIME PD	BEG POP	END POP	GAINS	LOSSES	DEATHS	WIA	DNBI	CMIA	ADMIN
1	372187	551531	216590	37246	5032	26622	3650	1079	63
2	551531	827298	332243	56476	7629	40670	5533	2545	98

SCENARIO:EUR-1

FILE FROM FORECAST CASUALTY ESTIMATION SUBSYSTEM
LOSS PROGRAM FOR USE BY MOSL SYSTEM TIME-PERIOD: 1

MOS	GRADE	BEG POP	END POP	GAINS	LOSSES	DEATHS	WIA	DNBI	CMIA	ADMIN
11B	E3	8771	13000	7823	3593	485	2587	352	162	7
11B	E4	10633	15762	9485	4357	588	3137	427	196	9
11B	E5	3880	5752	3606	1734	234	1248	170	78	4
11B	E6	3492	5177	3852	2167	292	1560	212	98	5
11B	E7	2328	3451	2297	1174	158	845	115	53	2
11B	E8	667	988	801	460	65	346	47	22	1
11B	E9	109	162	132	79	11	57	8	4	0
11C	E3	1754	2600	1679	833	112	600	82	36	2
11C	E4	2126	3152	2035	1009	136	726	99	45	2
11C	E5	1164	1725	1156	595	80	428	55	27	2
11C	E6	388	575	349	162	22	117	16	7	0
11C	E7	388	575	349	162	22	117	16	7	0
11H	E3	965	1430	1020	555	75	400	54	25	2
11H	E4	1169	1733	1237	673	91	485	66	30	2
11H	E5	388	575	403	216	29	156	21	10	0
11H	E6	388	575	403	216	29	156	21	10	0
11H	E7	194	287	146	53	7	38	5	2	0
12B	E3	5740	8503	3305	541	73	389	53	24	0
12B	E4	6959	10310	4007	657	89	473	64	30	2
12B	E5	3663	5427	2107	343	46	247	34	15	0
12B	E6	2320	3437	1319	202	27	145	20	9	0
12B	E7	1221	1809	700	112	15	81	11	5	0
12C	E3	1104	1635	636	104	14	75	10	5	0
12C	E4	1338	1983	770	126	17	91	12	6	0
12C	E5	293	434	162	21	3	15	2	1	0
12C	E6	244	361	134	17	2	12	2	1	0
12C	E7	122	180	68	10	1	7	1	0	0
12E	E3	55	81	32	5	1	4	0	0	0
12E	E4	67	99	38	7	1	5	1	0	0
12E	E5	48	72	27	3	0	2	0	0	0
12E	E6	48	72	27	3	0	2	0	0	0
12E	E7	24	36	12	0	0	0	0	0	0
12F	E3	165	245	92	13	2	9	1	1	0
12F	E4	201	297	112	15	2	11	1	1	0
12F	E5	122	180	66	8	1	6	1	0	0
12F	E6	97	144	55	8	1	6	1	0	0
12F	E7	24	36	12	0	0	0	0	0	0
12Z	E8	482	715	274	41	6	30	4	2	0
12Z	E9	79	117	45	7	1	5	1	0	0
13B	E3	6841	10136	4156	861	116	620	84	39	2
13B	E4	8293	12289	5039	1043	141	751	102	47	2
13B	E5	1847	2738	1113	222	30	160	22	[illegible]	0
13B	E6	1495	2216	966	245	33	176	24	11	0
13B	E7	586	869	353	160	13	72	10	5	0

Figure 2.8. Example of ELIM-COMPLIP and MOSL Systems Input Data

SECTION 3. USER SUPPORT FOR DATA COLLECTION

3.1 Data Collection Requirements and Scope. Except as defined in following subsections, user support requirements for externally generated inputs to ELIM-COMPLIP and MOSLS in mobilization mode will be the same as they are for the production versions ELIM-COMPLIP and MOSLS (Phase I).

3.1.1 FORECAST CES Casualty Estimates. In order to support the User Estimates methodology, the FORECAST CES must have the capability of providing detailed distribution of estimated losses to the enlisted MOS and grade level of detail. Three types of input information are discussed below. Also, the ability to vary the loss ratios as well as the size and mix of the population at risk by time period is essential to flexibility in deriving loss estimates.

3.1.1.1 Theater Army Units. The system data base must have a file where the MOS and grade level of detail by unit available for employment in the theater of operations is maintained. This file will provide the user with the means to select and to vary the population at risk within each time period. The computer program will sum the detailed MOS and grade level data which provide the total population at-risk data for each time period. The MOS and grade level data also provides the basis for distributing losses to the grade level of detail after category vulnerability rates and MOS loss factors have been applied as discussed below.

Source of Data:	TOE File maintained by USAMSSA FOR ODCSOPS.
Input Device:	Pertinent Type TOE required for the Casualty-Loss Subsystem data base will be extracted from the TO&E File and copied into a file in the subsystem. TOE data records by type units will not be modified by the FORECAST CES.

Frequency of Update: The TOE extracts used in the Casualty-Loss Subsytstem will be updated from the USAMSSA TOE File as required. It is estimated that update would be required twice annually.

File Format: See Table 3.1.

3.1.1.2 Vulnerability Rates and Loss Factors. The system will utilize the Vulnerability Rates for selected functional categories (e.g., Infantry, Armor, Field Artillery, etc.) and Loss Rates for MOS (e.g., Infantry 11B, 11C, 11H, 11M, etc.) as revised and published in the Casualty Estimation Study - Part I (CES-I) of December 1981, prepared by Force Analysis Directorate of the US Army Concepts Analysis Agency. These rates and factors will be programmed into the data base.

Source of Data: CES-I as noted above. Future revisions to these rates and factors will be made as they are updated by USA Soldier Support Center utilizing their revised methodology as referenced in CES-I.

3.1.1.3 Losses by Cause by Time Period. This data is required from any wargaming analysis for which the Direct Conversion methodology is to be used. Such data from the most current wargaming analysis may also be used, at the discretion of the user, for the User Estimates methodology. As explained earlier, the Direct Conversion methodology adapts data from actual wargaming analyses to produce output compatible with the ELIM-COMPLIP and MOSL Systems. The User Estimates methodology provides the user with the capability of testing the result of varying loss factors or varying the number of units in the theater. This methodology may also provide output data compatible for input to ELIM-COMPLIP and MOSLS when desired.

TABLE 3.1

FILE FORMAT: TO&E FILE

```
01 TOE-HEADER-RCD
      05  SRC                        PIC   X(9)
      05  PARA-NO                    PIC   X(2)
      05  CHG-NO                     PIC   X(2)
      05  RCN-1                      PIC   9(1)
      05  TOE-TITLE                  PIC   X(27)
      05  EDATE                      PIC   9(6)
      05  STAGE                      PIC   X(1)
      05  CLASS                      PIC   X(1)

01 PERS-DETAIL-RCD
      05  DETAIL-ID
          10  SRC                    PIC   X(9)
          10  PARA                   PIC   X(2)
          10  CHG-NO                 PIC   X(2)
          10  RCN-3                  PIC   9(1)
          10  IDENT                  PIC   X(1)

      05  DETAIL-ID
          10  BRANCH                 PIC   X(2)
          10  GRADE                  PIC   X(2)
          10  MOS CO.
              15  MOS 30             PIC   X(3)
              15  MOS 40             PIC   X(1)
              15  MOS 50             PIC   X(1)

      05  STRENGTH
          10  LEVEL 1                PIC   9(4)
          10  LEVEL 2                PIC   9(4)
```

It is recognized that only a true wargaming capability such as that utilized by USA Concepts Analysis Agency for such Army projects as OMNIBUS or Total Army Analysis can attempt to assess losses by cause (e.g., KIA, WIA, etc.) over time. It is not the purpose or intent of the FORECAST CES to provide a wargaming capability. What this interactive system does provide, is a means for interested users to provide their own loss-cause factors for Battle, Non-Battle, and Administrative Losses over time; or, for users to use the best data available to derive their own loss cause factors for input into the system. User input factors are applied against user input theater population data to derive casualty/loss estimations.

Source of Data: Most often, the best source available for loss estimating factors by time period will be the most recent Operational Readiness Analysis (OMNIBUS) or the last Total Army Analysis (TAA) report. The factors will be derived from OMNIBUS or TAA. For the future, if it were determined that the most recent OMNIBUS or TAA loss data provided the best basis for estimating such factors, it should be possible to coordinate production of an additional tape output from the latest CAA theater wargaming effort that summarizes the rates of loss for each type of loss (KIA, WIA, Died in Hosp, Admin, etc.) for each of eighteen 10-day time periods. These loss rates must then be fed to the FORECAST Casualty Estimation Subsystem for use in loss estimates.

Data Format: The CES-I report (published by CAA in December 1981) in its discussion of methodology indicates that the Casualty Stratification Model (CSM) has the ability of producing data in the following format:

Total Theater Casualties
(By 10-day time periods for 18 time periods with a Total column)

Battle Losses
- KIA
- CMIA
- WIA
- Died in Hospital (DIED)
- Evacuated from Theaters (EVAC)
- Returned to Duty from Hospital (RTD)

Non-Battle Losses
- Disease and Non-Battle Injuries (DNBI)
- Returned to Duty from Hospital (RTD)
- Evacuated from the Theater (EVAC)

Administrative Losses
- AWOL
- Disertion
- Confinement
- Missing (not in action)

Input Device: Data provided on tape would be fed directly into the FORECAST CES or it may be entered via an interactive CRT terminal.

3.1.1.4 Theater Casualties (MOS and Grade). These data are required from any wargaming analysis for which the Direct Conversion methodology is to be used. The data is input into the FORECAST CES, and with the input of Losses by Cause by Time Period (paragraph 3.1.1.3) provides the computer program is provided with the basis for calculating population and loss data for input to the MOSL and ELIM-COMPLIP Systems.

Data Format: The CES-I report in its discussion of the CES-I methodology indicates that the CSM report generator has the capability to produce data in the following format:

Total Theater Casualties WARMAPS Format

Time Period - 10 days (18 periods)
MOS (3 digits)
Grade (1 digit)
Casualties (7 digits)
Casualty Rate/1000/day (5 digits)

Input Device: Data provided on tape would be fed directly into FORECAST CES for use by the computer program.

3.1.1.5 Status of Theater Evacuees. Once the distribution of casualties and losses by time period in the theater has been determined, there will be one category of loss, Evacuated from the Theater, where additional status information is required. The CAA-operated Patient Flow Model (PMF) is designed to simulate the flow of inpatients through the multiechelon hospitalization/evacuation system. It contributes ths information by operating within the WARRAMP system of models. The PFM Level 3 (CONUS) provides data relative to the disposition of evacuees from the theater while in CONUS.

Whether the FORECAST CES is operating in the User Estimates or Direct Conversion method, the subsystem will require this information. Information in the format described below is normally calculated for analyses such as OMNIBUS or TAA.

Data Format: Time Period - 10 days (18 periods)
Patient Population (from theater evacuation)
Returns to Duty
Deaths in Hospital
Disability Separation

Input Device: Data provided on tape from the latest wargame analysis would be fed directly into the FORECAST CES for (1) use in

computing factors (User Estimate Method) or (2) used directly (direct Conversion Method) in providing MOSL and ELIM-COMPLIP compatible population and loss data.

3.1.2 Reserve Component Strength Projections. Whether from a Reserve Component Strength Projection Module as defined in the FD, or from an interim processor, there will be required projections of activatable strengths, along the dimensions defined in Subsection 2.1.4, for any mobilization scenario that changes either the date of M-Day, or the activation schedule (relative to M-Day) for TPUs. A separate generation of outputs will also be required after each update of the RC Composite File for any "baseline" activation scenarios.

3.2 Data Base Impacts.

3.2.1 Equipment Impacts. The enhanced FORECAST system will operate on the current or planned FORECAST computer systems. No additional computer hardware will be required, except for four to six additional terminals (IBM 3278/3279 type) to permit additional users to access the system and one additional IBM 3350 disk at USAMSSA to accommodate the large data files required.

3.2.2 Organizational Impacts. No changes in organizational structures will be required by these enhancements. The need for additional personnel to operate the systems will depend on the extent to which FORECAST will be run in mobilization planning mode in parallel with ongoing production of operational manpower programs.

3.2.3 Development Impacts. Development and testing will be conducted in parallel with operational use of the current systems and implementation of other enhancements already in progress. Data sets for one complete ELIM-COMPLIP run stream will be required for system level testing of these enhancements. No other significant impacts are anticipated during development.

3.2.4 Effects of Deficiencies in Static Input Data. As with any such system, erroneous data used as inputs will affect the accuracy of the outputs. The effects of errors in the EMF and GLF have been explored in several efforts related to the ELIM-COMPLIP and MOSLS development. Clearly errors in constructing the starting inventory (in file MT4 or MT4MOB) can seriously bias the accuracy of the end products. Likewise, inadequacies in the MOBPERS RC Composite File will directly affect mobilization strength projections. It is not possible to define exactly the relationships between errors in the input data and errors in the end product. Because of the methodologies used in these systems, random errors in the inputs will often have minimal effects on the results; however, systematic errors have been observed in the past that cannot be overcome by these methodologies and can seriously bias the results.

The preceding sections of this RD have defined several new inputs, new files, or new data elements in existing files that are required to satisfy the functional requirements in the FD. Any failure to provide these files (or data elements) will negate the ability of the enhanced systems to meet some objectives. The effect of missing data elements is defined implicitly in the System Specification, where the use of each data element is presented.

Tab 4

Evaluation of Army Reserve Component Yield Rate Estimation Methodologies

By:

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May 1982

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EVALUATION OF ARMY RESERVE COMPONENT YIELD
RATE ESTIMATION METHODOLOGIES

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EVALUATION OF ARMY RESERVE COMPONENT YIELD RATE ESTIMATION METHODOLOGIES

PURPOSE

The purpose of this report is to provide an evaluation of a conceptual model, developed by the Strategic Studies Institute, US Army War College, to improve predictions of Reserve Component personnel show rates at the time of a full mobilization.

INTRODUCTION

In November 1978, the Office of the Deputy Chief of Staff for Operations and Plans, at the request of the ODCSPER, asked the Strategic Studies Institute to undertake a study on Reserve Components mobilization to determine the feasibility of validating mobilization show rates then being used, or of developing improved predictions of actual reserve show rates at a time of full mobilization. For the purpose of the study, show rate was defined by the sponsor "as a percent of reserve personnel in a given category that would report in accordance with orders issued by proper authority."[1]

The problem to be addressed by the study was to determine a means of improving confidence in show rate estimates, or of proposing a more reliable and credible system to generate estimates of the employable/deployable soldiers in the trained manpower pool. As originally conceived, the study was to be divided into two phases:

- Phase I - determination of the feasibility of attempting to establish scientifically valid show rate estimates for each category of reserve manpower, i.e., predicting the behavior in the aggregate of reserve members and retirees at a time of full mobilization.
- Phase II - determination of the appropriate methods of sampling and surveying each category of reserve manpower if

[1]Disposition Form, Subject: Definition of "Show Rate" for Feasibility Study, HQDA, DAPE, 26 October 1978.

the Phase I analysis was satisfactory to the sponsor of the study (ODCSPER).

The Phase I portion of the study found that show rate, as a tool for estimating the number of deployable/employable manpower is inadequate and misleading because:

- It does not recognize the significant differences, complexities, and diversities between each component and category of the Reserves such as size, composition, demographic character, organizational structure, and statutory basis.
- It is based on inaccurate analysis of historical evidence that failed to take into account the different circumstances of each past mobilization, the levels of mobilization, the differences in size, make-up, structure, and statutes that applied at the time.
- It does not differentiate between management policies and the impact of those policies on the various elements of the reserve manpower pool.
- It does not show the assumptions and policy judgments personnel managers will make in their analysis of the mobilization process.
- Show rate estimates for each element of the reserve manpower pools are not developed by scientifically supportable procedures.

The study recommended that a model be developed that would take into account and integrate all the factors that influence the mobilization process. The sponsor approved the recommendations and asked that the study group develop a preliminary conceptual design of a mobilization manpower management model.

The proposed model was developed and the study group issued its final report, titled "Feasibility of Predicting Reserve Show Rate at

Mobilization: A Proposed Model for Mobilization Manpower Management" on 18 July 1979. A copy of the Study Overview, extracted from the final report, is at Appendix H.

On 29 September 1981, the General Research Corporation was awarded a contract relating to the utilization of FORECAST (ELIM-COMPLIP and the MOSL System) for mobilization strength planning and management. The contract further required that an analysis and written report with appropriate recommendations be made evaluating the adequacy and practicality of the show rate derivation model methodology proposed in the feasibility study. This report responds to that requirement.

BACKGROUND

Army Reserve Components

To set the stage for understanding the complexities of the yield rate problem, the following overview is presented.

The purpose of the Army Reserve Components is to "Organize and maintain trained units and qualified persons in peacetime for military training and a reservoir of trained units and individual reservists to be ordered to active duty in the event of war or national emergency to fill the needs of the Armed Forces whenever more units and persons are needed in the regular components."[1] The Army Reserve Components are:

The Army National Guard (ARNG)

The ARNG is the Army portion of the organized militia of the several states, Commonwealth of Puerto Rico, US Virgin Island, and the District of Columbia whose units and members are Federally recognized.

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[1]"Feasibility of Preditcing Reserve Show Rate at Mobilization: A Proposed Model for Mobilization Manpower Management" Strategic Studies Institute, Army War College, 18 July 1979.

The United States Army Reserve (USAR)

The USAR is a Federal force consisting of individual reinforcements and combat, combat support, combat service support, and training type units.

Army Reserve Categories

In the USAR are the:

- Ready Reserve, consisting of units and members of the Reserve components liable for involuntary active duty in time of war, national emergency declared by the President, or when otherwise authorized by law. The Ready Reserve consists of the:
  - Selected Reserve, which is that portion of the Ready Reserve made up of units and Individual Mobilization Augmentees required to participate in inactive duty training and annual training, both of which are in a pay status. The Selected Reserve also includes persons performing initial active duty for training (IADT) and full-time support personnel.
  - The Individual Ready Reserve (IRR), which consists primarily of soldiers who have completed the active portion of their enlistment contracts and have a remaining Military Service Obligation (MSO). The IRR members are reservists without unit affiliation.
- Standby Reserve, consisting of those individuals who have completed their Ready Reserve obligation and are fulfilling the balance (1 year or less) of their service obligation in an active or inactive status; and those who are temporarily unable to meet the participation requirements of the Ready Reserve. For reasons not germane to the discussion, the Standby Reserve may be phased out as a source of pretrained manpower.
- The Retired Reserve are those individuals whose names are placed on the Retired lists in accordance with the law and

appropriate regulations. The pool of military retirees is made up of two groups.

- Regular Army officers and enlisted men who have retired upon reaching 20 or more years of active Federal service.
- Reserve officer and enlisted men who have accumulated 20 years of active and/or reserve duty.

The Army National Guard

In the Army National Guard there is a Ready Reserve consisting of:

- Units called the Selected Reserve.
- Members attached to a unit but temporarily assigned to the Inactive National Guard (ING).

Roles, Missions, and Historical Deficiencies

There have been no substantive changes in the basic roles and missions of the Army reserve components as a result of the total mobilization for World War II and the partial mobilizations of the Korean conflict, Berlin crisis of 1961, and Vietnam in 1968. The dual role of the Army National Guard as both a state and federal force, and the role of the Army Reserve as an exclusively federal force remains unchanged.

The basic missions of the ARNG continue to be to furnish, on mobilization, trained units to augment the active Army and to provide a base for further expansion of Army forces. The basic mission of the Army Reserve is to furnish both trained units and individuals to augment the Army and provide a base for expansion. Included in the Army's mission is the requirement to furnish trained individuals to bring active and reserve units up to strength.

Previous studies have avoided coming to grips with the show rate problem. The rates reported for many units, going back to the total mobilization of World War II and the three partial mobilizations which have followed, failed to account for the following

- Losses that occurred between "alert" dates and "reporting" dates.
- Unit losses that were made up by the initiative of commanders who recruited from non-mobilized, or later mobilizing units and individuals. The 95% show rates reported for many such units failed to take into account unit losses prior to reporting and were not counted against show rates.
- Erosion and degradation of trained manpower recruited from other units and the IRR were not taken into account.

Historically, major deficiencies relating to the mobilization of pretrained manpower during previous mobilizations were inaccuracies in the personnel records of individual reservists, failure to screen pretrained individuals for continued eligibilty for active service, and elimination of individuals who would not serve in wartime for various reasons. For example, during the partial mobilization of the Korean conflict, 10% of all Army reservists were found to be physically unfit for military service and another 10% were ineligible for other reasons.

ANALYSIS OF YIELD RATE METHODOLOGIES

Establishment of Show Rates

The OSD Draft Consolidated Guidance of 1978 established the following yields as minimum management objectives in the 180-day period following a mobilization order:

- Selected Reserve (ARNG & USAR units) 95%
- Individual Ready Reserve 70%

In 1979 the OSD Draft Consolidated Guidance established an enhanced IRR mobilization yield no lower than the following:

	FY 81	FY 82	FY 83
IRR Yield Rate	80%	85%	90%

A report completed in 1978, under the sponsorship of the Deputy Assistant Secretary of Defense (Reserve Affairs), called the Draft DOD

Minuteman Training Study, apparently formed the basis for the yield rates cited in the Draft Consolidated Guidance. The Study Group concluded that the Minuteman Study drew on the mobilization processes from the histories of previous partial mobilizations which constituted only a fraction of the total reserve population ordered to active duty. As pointed out in the SSI study, attempts to apply the show rate experience of those partial mobilizations are inadequate and misleading for the reasons mentioned earlier in this report.

Predictions and Applications of Show Rates

As discussed later in this report, the OSD and the Army have introduced a number of initiatives to reduce losses of pretrained manpower, to increase the size of the pool, and to tap the experience held by military retirees. The downward strength trends in the Reserve Components have been reversed; however, the number of pretrained personnel needed to equal wartime authorizations and meet requirements will be greatly influenced by the number of individuals who voluntarily or involuntarily fail to report for active duty when so ordered; thus, show rates must have a reasonable predicability, based on mathematical evidence, to support estimations of reserve availability.

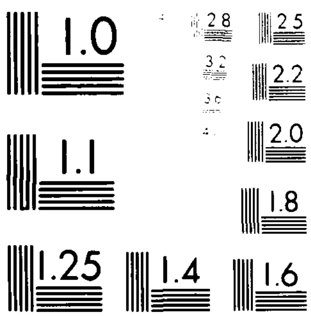
Personnel managers use show rates for two purposes:

- As a gross estimate of the number of pretrained manpower who would become employable/deployable assets if mobilization occurred.
- As a means of expressing management objectives of the "yield" in pretrained manpower which the system must produce; thus, show rate functions in the first instance as a measurement tool. In the latter, it operates as a management objective. In practice, however, the terms are interchangeable among personnel managers.

The problem of determining and validating estimates of the availability of pretrained manpower is not unique to the Army. The

AD-A116 143 GENERAL RESEARCH CORP MCLEAN VA MANAGEMENT SYSTEMS DIV F/G 5/9
MODIFICATIONS TO ELIM-COMPLIP AND MOSLS FOR MOBILIZATION STRENG--ETC(U)
MAY 82 K D MIDLAM, W E BARTLETT, E BERGE MDA903-81-C-0649
UNCLASSIFIED GRC-1257-02-82-CR NL

3 of 4
AD A
116 143



MICROCOPY RESOLUTION TEST CHART

other services have a similar problem. Notwithstanding the problems, accurate estimates or predictions are fundamental to realistic predictions of trained manpower to man and sustain the force if mobilization occurs. Yield factors, or show rates, influence the demands for pretrained manpower to meet mobilization requirements.

Currently the Army applies the following show rates for each category of pretrained manpower:

Category	Rate
Reserve Component Unit Members (Selected Reserve)	95%
Standby Reserve Members	50%
Individual Ready Reserve	
Officers & Bonus Recipients	90%
All Others	70%

A skill match, rather than show rate is used by the Army to calculate the availability of retired personnel at mobilization. Skill match means that a retiree has been preassigned to a specific CONUS mobilization station requiring his grade and skill. Projections relating to this program are:

Year	Programmed Skill Matches
Current	80,000 (89,000 actual)
FY82	100,000
FY86	120,000

Initiatives to Produce Trained Strength in Units and the IRR

Initiatives to Improve Trained Strength

Wartime planning and mobilization exercises show that in the event of a major conflict requiring full mobilization there would be insufficient trained manpower to meet requirements. A wide range of proposals, programs, and management initiatives have been, and are

being taken to bring trained strength equal to wartime requirements, especially in selected reserve units and the Individual Ready Reserve.

The Selected Reserve

In his Fiscal Year 1983 Annual Report to the Congress, the Secretary of Defense stated that the current Reserve program is targeted to produce trained strength in units equal to wartime requirements by 1986. At the end of FY 1981, the Army Reserve Components stood at about 175,000 trained personnel in units below the FY 1986 wartime objectives. Based on an increase of 37,700 during FY 1980 and 41,000 in FY 1981, the OSD believes it is reasonable to assume that the Army will meet its wartime requirements by 1986.

The favorable turn-around in the Army's Selected Reserve strength is attributed by OSD to three positive programs. They are:

- Incentive or bonus programs for enlistment or reenlistment.
- Intensification of recruiting and retention programs.
- Meaningful training programs and other initiatives that improve the attractiveness of being a member of a Selected Reserve unit.

Additional incentives are being pursued to include:

- Alternative enlistment options of 3 or 4 years in the Selected Reserve.
- Options for completing initial training in two separate increments.
- Increased joint service advertising.
- Full-time recruiting force for each Reserve Component.
- Increased full-time active duty ARNG and Selected Reserve support to units to help commanders improve training and administration of their units.

The Individual Ready Reserve

After retirees, the IRR is the largest of the pretrained manpower groups. Although some increases are projected for the IRR they will not be sufficient to meet mobilization requirements. Thus, one of the most serious manpower problems facing the Army is the shortfall between mobilization requirements and the supply of pretrained individual manpower. Because not enough pretrained manpower is available to meet wartime needs, the Secretary of Defense in his annual report outlined some of the initiatives to close the gap between requirements and supply. They include:

- Extension of the 6-year military service obligation to 8 years (long lead-time solution).
- Incentive programs to keep members in the IRR and to encourage their enlistment in the IRR.
- A proposal that full-time Servicemen's Group Life insurance (SGLI) be extended to the Ready Reserve, including the IRR.
- Direct enlistment in the IRR.

There are a number of low cost, or no cost, initiatives that are, or have been, underway to increase the IRR strength. Some of these are:

- The initial benefits of the 1978 legislation giving women a 6-year obligation were realized in 1981 as women completed their 3-year active duty enlistments and were transferred to the IRR.
- The effect of 1979 legislation giving enlistees 26 years of age and older a 6-year service obligation will result in 1982 increases in IRR strength.
- Transfers from the IRR to the Standby Reserve during the last or sixth year of obligated service were terminated in 1979.
- Continuation of a test of 2-year active duty enlistments resulting in a longer time in the IRR.

- The ARNG expansion of the Inactive National Guard (ING) program to permit the continued unit affiliation of guard members who no longer train with their units.
- An IRR reenlistment bonus of $600 was tested with favorable results in FY 1981 to encourage unobligated members to reenlist for 3 years in the IRR or ING. As Congress did not extend the bonus authority, its reinstatement is being proposed at an increased amount.

Of the several categories of pretrained manpower, show rates for the "all others" category of the Individual Ready Reserve (IRR) are probably the most difficult to quantify. The IRR consists of individuals who are members of the Ready Reserve but have no USAR troop program affiliation. Although there are other sources of pretrained manpower, the IRR is the primary source of immediately available individuals to augment the active force and selected reserve units if mobilization occurs. There are several reasons for this:

- The IRR contains a greater number of available pretrained individuals in the reserve structure for utilization upon mobilization. Skills and grades are, for the most part, consistent with those in the active force.
- Enlisted soldiers in the IRR have generally, been off active duty less than three years. They are young, and the shelf life of their military and technical skills generally has not deteriorated.
- They are available for immediate recall, when needed, upon declaration of a national emergency by the President.

A number of management initiatives as stated earlier have been taken during the past few years to increase the size of the IRR and to improve the management and mobilization capability of this manpower source. The primary emphasis has been on strength increases and personnel retention initiatives. On the other hand, the management of the IRR poses difficult problems because members have no unit

affiliation or organizational loyalties. They are transient and remote from military control. Although assigned to Reinforcement Control Groups for purposes of identification, control, and administration, they are difficult to administer. They often fail to keep RCPAC informed of their whereabouts and status, and likewise, often fail to respond to official correspondence.

There are a number of negative attitudinal and motivational factors which may impact adversely on the responsiveness of the IRR during an emergency. These factors include, but are not limited to:

- Non-recognition, or lack of awareness, of the legal or moral responsibilities of a military service obligation.
- Conviction that a period of active service has satisfied the obligatory periods of service prescribed by law ("I served my time" attitude).
- Perceptions that passive membership in the IRR provides little or no opportunity for self-fulfillment.
- Changing circumstances, public attitudes, and political issues that color individual attitudes toward military service.

The problems of IRR management are further exacerbated by invalid addresses, whereabouts unknown, physical disability, hardship, single parentage, critical civilian jobs, etc. The critical "X" factor is whether they would respond to a mobilization order based on their perception of the national resolve, popular support of the emergency which caused them to be mobilized, their sense of duty, and other attitudinal factors which cannot be measured easily during peacetime. All these reasons point to the possibility that estimates of present show rates may be too high, especially for the IRR.

The shortfalls between mobilization requirements and the supply of pretrained individual military manpower can be overcome by increases in any supply category to include Active and Reserve Component unit

strength and retirees. Currently, primary emphasis is on improvements for the IRR. Programs under consideration by OSD for new initiatives to reduce the IRR strength shortfalls and to increase retention rates have been discussed earlier in this report.

These programs may provide long-term increases in the strength of the IRR; they will not, of themselves, improve show rates.

Although show rates may be adequate for expression of OSD goals, they are not predictors or generators of the number of pretrained manpower in the separate and disparate elements of the Reserve that would report for duty on mobilization. Single point estimates do not allow manpower managers to vary show rate percentage estimates under differing conditions. There is no empirical evidence or basis in historical fact to support the present show rates.

Considering the complexity of the mobilization process and the characteristics of the several elements of the reserve manpower pool, the SSI Study Group came to the conclusion that the concept of "show" and "show rate" is inadequate. They concluded that the show rate concept should be replaced by a detailed set of known factors which takes into account and integrates all the factors that influence the mobilization process. For example, unknown factors such as failure to report due to lack of, or late notification; belief that military service obligations have been fulfilled; conviction that a justifiable case for exemption exists; resentment over the circumstances of mobilization; the National will and resolve; popularity of the conflict; and the levels of the mobilization could be integrated with other known factors in the mobilization process in a manner which would be scientifically sound and supportive of the personnel management decision-making process. A comprehensive overview of the individual known factors under which a soldier may qualify for exemption, delay, or restricted assignment in the event of mobilization is in the SSI Study report.

AN OVERVIEW OF THE PROPOSED MODEL

The SSI Study Group recommended that the use of show rates as a management predictor of pretrained manpower availability be discontinued. The group recommended that a comprehensive mobilization instrument (model) be developed to support Army personnel manager requirements. Section V, and Figures 1, 2, and 3, Appendix A outline the concept and framework of a model which could be used with existing RCPAC data bases. The following is a brief outline of the operational components of the proposed model and its flexibility in terms of evaluating alternative policies under a mobilization scenario.

The proposed model has four sequential, interrelated decision-making processes. They are:

- A Manpower Pool Development Process where the user identifies a manpower pool for analysis. The manpower pools are preselected and could, as an example, contain the members of the following components and categories:
  - ARNG unit
  - IRR
  - ARNG & USAR unit
  - ARNG & IRR
  - USAR & IRR
  - ARNG/USAR unit & IRR

  If the preselected pools do not meet the needs of the user, the model contains the logic capability to develop a specific pool.
- A Manpower Pool Profile Identification Process which gives the user the capability to display the manpower pool by profile levels of detail. The levels of detail are disaggregated as follows:

- Level 1: Officers and/or Enlisted personnel
- Level 2: Males and/or Females
- Level 3: Married and/or Single
- Level 4: Junior and/or Senior grades

- A Mandatory Exemptions Policy Development Process which permits the user to develop a mandatory exemptions policy. Mandatory exemptions would be those specified in Presidential or Congressional Mobilization orders and as such are mandatory for the specific mobilization. They could include such factors as underage and overage; high school students; dependents; and single parents. For each factor the user selects, the model displays a report showing the number of people affected by level of profile detail who are exempted by application of the factors.
- Discretionary Exemption/Delay/Restricted Policy Development Process. After the user has identified the mandatory exemptions, the model gives him an opportunity to develop the discretionary exemption/delay/restricted assignment policies. These exemptions and delays were defined by the Study Group as those which the Army would accept and approve requests from members who met the criteria of a given factor.

Developmental Issues

The Study Group pointed out a number of outstanding issues that would have to be resolved prior to the development of the proposed model. The issues relate primarily to personnel management requirements, hardware capability, and the efficiency of the software package. The issues identified were:

- The model must maintain the capability of permitting the user to draw out of the data base for analyses any manpower pool he wishes. On the other hand, because of considerable computer time required to draw unique manpower pools out of

the data base, the sponsor should identify the relatively few pools which would meet most of his reporting and analysis requirements. Computer run-time would be substantially reduced and output would lend itself to standard monthly outputs.

- To reduce computer processing time the sponsor should decide the level of profile detail that would be used routinely for preselected manpower pools. Preselection of profile displays would contribute to efficient computer usage and reduce unneeded printouts.
- Preselected packages should be developed which address HQDA policies relating to mandatory exemptions, discretionary exemptions, delays, and restricted assignments; however, the model must give the user latitude to exercise his judgment in selecting policies and estimations outside the realm of preselected packages (note: this raises a question as to whether a preselected policy package is necessary).
- The Study Group described the model in an interactive mode, i.e., one in which the machine tells the user at each step what he must do and, in turn, the user instructs the machine what he wants done next. Specific requirements for an interactive mode of operation, weighed against availability and capability of equipment and computer time, must be determined.
- Late in the study, the group determined that the restricted assignment category was an area that could be treated in the same manner as discretionary exemptions and delays. This determination was made too late in the study to incorporate this view into the logic flow of the model or the model displays. Restricted assignments should be incorporated in the model and treated as discretionary exemptions and delays.
- A model which simulates or is used to support an actual mobilization must account for the time sequencing of events.

The total force would probably not be mobilized all at once. A mobilization model must display the sequential mobilization of the force ranging from the 100k Presidential call-up to total mobilization.

- The model did not address the exemptions, delays, and failures to report for unit members and individual reservists in, and awaiting initial active duty for training (IADT). A determination must be made of the data available on people in the training pipeline or awaiting initial active duty for training.
- A determination must be made as to whether the Inactive National Guard should be treated as members of ARNG units or as part of the IRR in the proposed model.
- Model development must include the incorporation of retired Army personnel. It must also include estimates of draftees coming into the training pipeline and treated as individuals awaiting IADT.

Evaluating Subjective Factors

One difficulty with the use of the model as defined by SSI is its limited ability to deal with attitudinal factors that would affect yield rates. Nothing in existing data bases provides guidance on how yields are affected by, say, political factors; and yet, losses due to simple refusal to serve may far outweigh losses due to the more directly observable factors.

The relevance of assessing attitudes lies in the need to "predict" motivation to report at the time of an alert. In this regard, the decision whether or not to report is affected by much the same attitude factors which motivate an individual to accept or reject a job. Basically, these attitudinal factors can be classified under five headings:

- Organization Attractiveness (i.e., what the benefits are as a result of returning to service)
- Individual Values (i.e., self-satisfaction needs)
- Social Responsibility (i.e., to home, community, and nation)
- Economic Constraints (i.e., the need for financial security)
- Physical Constraints (i.e., physical health, wellness)

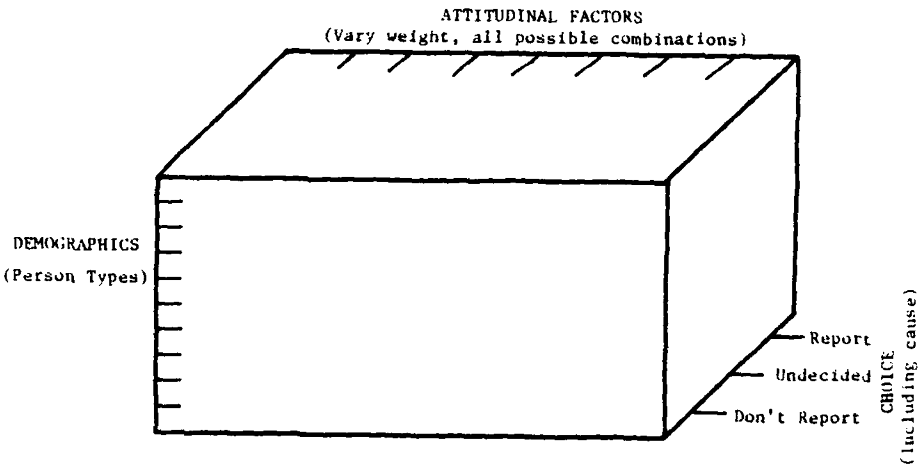
The decision to report is simply a matter of the individual weighing these factors in terms of (a) one's present status versus (b) one's predicted status upon return to service. A SHOW-NO SHOW decision derives from comparing the trade-offs. Further, the decision is time-bound; that is, it is always made in the present and is driven by an individual's current values, responsibilities, economic constraints, etc. Nonetheless, to predict the propensity to report, data must be developed to demonstrate how these factors affect an indiviudal's decision and how that decision can change as those factors vary at any one time.

The most effective method for developing this data would be a validated research survey. Despite obvious limitations, surveys tend to be most suitable for determining people's perceptions, values, and choices. Although a survey would probably not provide precise estimates, reliable ranges of probability could be developed within the recognized limits of this technique. The methodology of conducting such a survey should include:

- An exploratory pre-survey phase involving in-depth, face-to-face interviews with individuals or small groups of every element of the Reserve Components. All grades should be represented. The pre-survey phase should address the specific variables which define the five broad factors metnioned above, and the different choices people would make given variations in those factors (i.e., how those variations would affect the individuals propensity to respond to mobilization orders).

- The development of the actual questionnaire(s), based on the findings of the pre-survey phase, that would be administered to a large and representative population of each element of the Reserve force.
- Validation of the survey findings through the use of a retrospective criterion sample.

In the research literature concerning job choice and commitment, attrition/retention, job satisfaction, etc., much knowledge exists by which the five broad attitudinal factors (described earlier) could be operationalized for survey purposes. Pre-survey interviews would be used to render that general knowledge to Reserve-specific terms. Various scenarios could then be written to form the actual survey items; each scenario describing conditions which vary the influence of each attitudinal factor. Survey respondents would indicate their choice (i.e., REPORT-DON'T REPORT) given the variations in attitudinal factors each scenario posed. Supplementary queries (e.g., "in light of the scenario, why did you decide as you did?") could be employed in the survey to link "cause" with "conditions" and "effects (choice)." Relevant demographic data could be obtained to profile <u>types of individuals</u> in light of choices made for the various scenario conditions. The data-development concept behind the survey could thus be conceptualized as follows:



To validate the findings of the survey, a criterion sample (e.g., actual "shows," "no-shows") could be identified from mobilization during the Vietnam era. The same survey could be administered to those shows/no-shows (a retrospective criterion sample) to validate current survey results. Based on the findings of the current survey, one shoudl thus be able to reasonably predict the responses of the Vietnam era sample given conditions of that time. Obviously, full predictive validation of the survey could only be had were an alert to be called in the future and the actual behavior (show/no-show) of the present reserves compared to their survey responses. In the meantime, the retrospective validation would have to suffice. At very least, the current full-scale survey would provide a data base that could be predictively validated in the future. This, alone, seems worth the effort since no such knowledge presently exists.

It should be noted that conduct of an attitudinal survey is not intended to be a replacement for a yield rate model nor is it intended to be a prerequisite for implementation of such a model. The model, as proposed by SSI, should be implemented immediately. The model should be used, however, with the understanding that:

- Subjective judgment of the user is required when using the model.
- The attitudinal survey can be conducted at any time and the results used to develop more refined yield rates.
- The model, as proposed, utilizing only situational factors and not including attitudinal factors, will predict a higher yield rate than can really be expected for most mobilization scenarios.

CONCLUSIONS

1. The SSI proposed model for mobilization manpower management is a workable model as presented.[1]

2. The SSI model has some inherent weaknesses. They are:

   a. It relys on an existing data base (RCPAC) which is less than adequate due primarily to failure of the reserve members themselves to keep it updated.
   b. It is incomplete, in that it does not give adequate consideration to all relevant attitudinal factors (sometimes called "X factors").
   c. It does not consider retirees or draftees as potential manpower assets.
   d. It fails to project yield rates at various points in time for each level of mobilization.

3. The proposed model cannot work properly until pre-selected policies on exemptions, delays, etc., have been established.

4. It is not practicable to develop a new data base for the model. Alternatives to development of a new data base are:

   a. Rely on existing RCPAC data base or,
   b. Wait for development of the Total Army Personnel Data Base (TAPDB) which is currently in the concept stage.

5. The model does not take into consideration the number of soldiers that will report to their mobilization station and, after reporting, be nonemployable because they qualify for an exemption or delay, or they submit a request for exemption/delay which goes into extended litigation.

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[1]If implemented under CMS on the FORECAST IBM 4300, however, the interactive software should to be redesigned to take advantage of the capabilities of the Display Management System (DMS) software.

6. The model in its proposed configuration (utilizing only the situational factors presented) will predict a higher yield rate than can really be expected because attitudinal factors have not been adequately considered.

7. Modification of the proposed model should be based upon results of an attitudinal survey conducted in samples of each pre-trained manpower category.

RECOMMENDATIONS

It is recommended that:

1. The SSI proposed model for mobilization manpower management be implemented.

2. An attitudinal survey be conducted with representative samples of each category of pretrained manpower.

3. Based on results of the attitudinal survey, the proposed model be modified to include more precise consideration of attitudinal factors in arriving at yield rates for the various categories of pretrained manpower.

4. Policies applicable upon mobilization which deal with exemptions, delays, etc. be pre-selected immediately for use by mobilization planners.

5. Periodically updated extracts of the RCPAC data bases be utilized for the model pending development of the Total Army Personnel Data Base.

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Appendices
Modifications
To ELIM-COMPLIP and MOSLS for
Mobilization Strength Planning and Management
For Enlisted Personnel

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APPENDIX A

MISSION ELEMENT NEEDS STATEMENT

MISSION ELEMENT NEEDS STATEMENT (MENS)

1. *Mission Area Identification*

a. ODCSPER is required to plan, program, budget, and monitor the strength of the Army. This is done, in part, by projecting the personnel strength (both aggregate and detail) through the program years and comparing actual to projected strengths, gains, and losses as programs mature. This forecasting capability must reflect the influences of personnel management policies in the determination of the composition of the force throughout the planning cycle. The net product is a document that quantifies the number of people in given categories the Army should obtain, or retain, to achieve stated personnel management and national objectives. This capability must be continously operational in war and peacetime and flexible enough to adapt to national policy changes introduced as a result of partial or full mobilization, wartime, and demobilization.

b. ODCSPER presently operates the ELIM-COMPLIP model for projection of total enlisted strengths. Enhancements to ELIM-COMPLIP under the FORECAST system will provide projections at the MOS and grade level of detail. The output of the ELIM-COMPLIP model is termed the Active Army Military Manpower Program (AAMMP).

The AAMMP is a series of reports that provide numerical data pertaining to Active Army military manpower on a monthly basis for the current year, the budget year, and the five years contained in the Five Year Defense Program (FYDP). The gains, and losses data used by Headquarters, Department of the Army (HQDA). The AAMMP is used for planning, programming and budgeting, for development or modification of mililtary personnel policies that affect strength, gains, and losses, and for monitoring progress against plans in strength-related areas.

Projections from the AAMMP are used in the planning process to establish the force structure allowance (FSA), to plan the size of the training base, and to plan the level of recruiting needed to sustain the force. The FSA is the generalized planning target for the number of military personnel that can be authorized in Army units. It is developed through coordination between ODCSOPS and ODCSPER. The FSA becomes the expected personnel availability for ODCSOPS use in planning the force structure of the Army, and also provides ODCSPER with the total number of manpower spaces that can be authorized in units. Planning for the training base capability must consider the numbers of new accessions to be trained in future years for both the Active Army and the Reserve Enlistment Program (REP). The AAMMP contains the official estimated number of accessions to be trained, and therefore, becomes the starting point for planning the size of the training base by ODCSOPS and Training and Doctrine Command (TRADOC). Similarly, plans for the size of the recruiting force are developed from consideration of the new accessions established by the AAMMP.

The AAMMP provides the official projections of strength and related information to support the FYDP. A specifically designated alternative of the AAMMP is produced to reflect each major step in the programming cycle, including development of the Program Objective Memorandum (POM) and each update of the FYDP. This designated alternative contains details not included in the FYDP itself, and provides the basis for strength-related costs that are contained in the FYDP. During development of program decisions, the AAMMP is produced to serve as the basis for assessing the impact of major changes in strength or other policies.

Designated alternatives of the AAMMP are produced to correspond with the POM base case, incremented case, and decremented case.

Program information based on the AAMMP includes the following:

- Monthly projections of total strength; operating strength; trainees, transients, holdees, and students (TTHS); cadets; officers; enlisted personnel; and female personnel.
- End strength for each fiscal year (FY).
- Manyears, or average strength, for each FY.
- Projected losses, by type, by month.
- Projected initial entry training, by month, for both Active Army and REP programs.
- Projected recruiting requirements, by month, by type.
- Projected reenlistments, by month, by type.

Budget estimates of those costs that are strength-related are based on the AAMMP. These include:

- Pay and allowances of military personnel.
- Accession costs.
- Separation costs.
- Subsistence costs.
- Active Army and REP initial entry training.

A specifically designated alternative of the AAMMP is keyed to each budget submission, including the Budget Review Committee (BRC) version, the Officer of the Secretary of Defense (OSD) Estimate, the President's Budget, and the budget enacted by Congress.

Each month, an official update of the AAMMP is produced to reflect the latest reported strength data. This monthly update serves as the basis for monitoring progress against goals in strength, gains, losses, and other areas. Additionally, this monthly update shows future implications of the latest actual data, including costs, operating strength deviation, and future recruiting requirements. By portraying the future implications of the latest actual strength data, the AAMMP becomes a vehicle to identify areas that need management attention. Additional alternatives of the AAMMP are frequently made to examine the effect of policy changes being considered. This use of the AAMMP is one of its most important. Through a careful analysis of the AAMMP,

trends or deviations in many strength-related areas can be identified and addressed before they reach the critical stage.

2. Deficiency

a. Automated aids to enlisted manpower planning currently focus on the peacetime scenario. The total Army level module of the FORECAST system, ELIM-COMPLIP, is primarily a peacetime, active Army manpower planning tool with limited mobilization capabilities. In the event of mobilization, that module (if left unchanged) will not provide the timely and accurate total Army manpower planning data that ODCSPER needs for effective strength management. The ELIM-COMPLIP module was originally used to estimate Vietnam era draft requirements, but that capability has been obscured by subsequent changes and disuse. The MOS level module, now under development, is also oriented toward peacetime, but is being designed such that its interface with ELIM-COMPLIP is not scenario dependent. In general, the AAMMP is produced to meet peacetime requirements, using peacetime information sources and relying upon the level of data availability and accuracy associated with routine peacetime operations. As the Army mobilizes (partial or full or total) the requirements for the AAMMP will change (e.g., frequency of production, gain, loss, and strength categories to be reported), information sources will change and only minimum descriptive personnel information will be available. Procedures for the accounting and forecasting of all the mobilization era classes of personnel are undefined, and thus not implemented. Sources of, and procedures to process, information on scheduled mobilizing TPU members, IRR Standby Reserve and retirees are not incorporated into FORECAST--actual mobilized reservists/retirees will be processed normally through SIDPERS to the EMF and thence to FORECAST. Present sources for casualty information (SIDPERS) would likely be interrupted or delayed, thus degrading the ability to accurately forecast wartime casualties. Sources for casualty rate estimates are under development now, but need to be interfaced with the FORECAST system. Thus, lacking critical information on gains, losses and characteristics of the force,

"what-if" policy excursions are impossible and actual mobilization forecasts would be of limited usefulness. A wartime military manpower program must simultaneously consider the effects of casualties, other wartime losses, and all sources of manpower to determine the effects on manning levels, training base capability and skill requirements, i.e., calculate and display the adequacy of the manpower program over time.

b. The Mobilization Manpower Policy Analysis Study (MMPAS) (under development by USACAA to be completed March 81) will offer some mobilization/wartime planning capability, but will not provide a mobilization/wartime/demobilization AAMMP. The MMPAS model will not possess (a) the degree of detail required for manpower planning, (b) the sensitivity to reflect many personnel management decisions, and (c) the capability to monitor progress. It essentially needs data which should be produced by the FORECAST system.

3. <u>Existing Program Capability</u>

a. Severely limits ODCSPER's mobilization planning capability.

b. Forces "back-of-the-envelope" error-prone forecasts.

c. Degrades ODCSPER's ability to properly allocate scarce manpower resources during mobilization.

4. <u>Constraints</u>

a. The wartime AAMMP for the enlisted force must be compatible with that to be produced by the officer FORECAST modules.

b. As little as $170K in FY 81 can be allocated to fund ADP system changes for mobilization, and as much as $1,000,000 could be made available by reprioritizing the FORECAST development schedule. Reprioritizing of FY 82-86 program could yield additional funds, if needed.

c. A reduced (amount and frequency) data flow from the Active Army under SIDPER-WT rules, and the availability of data on mobilizing Reserve and National Guard personnel.

APPENDIX B

CONTRACTUAL DEFINITIONS OF PROJECT TASKS

Following are the contractual definitions of Phase I tasks.

PHASE I--ANALYSIS AND DOCUMENTATION OF FORECAST (ELIM-COMPLIP AND MOS LEVEL) MOBILIZATION PLANNING CAPABILITIES.

(1) Develop a functional description (FD) and system specification (SS) for the utilization of FORECAST as an automated aid to enlisted manpower planning in simulated and actual mobilization conditions.

(2) The FD and SS must address the employment of ELIM-COMPLIP, the MOS level subsystem (modules) of FORECAST, and the subsystem interfaces, as the Army transitions from peace to war and back to peace again. They should include, as a minimum, the following:

(a) Implementation of a draft with, or without, a reserve call-up.

(b) Casualty forecasting, based upon approved pre-war rates and actual experience (when available).

(c) Accounting for the utilization of recalled retirees.

(d) Utilization of Rapid Deployment Force (RDF)

(e) Partial or full mobilization of reserves.

(f) Phased drawn down of mobilized force to peacetime manning levels.

(g) Production cycle changes (processing time, frequency, volume).

(h) Allocation of characteristic groups to the total mobilized enlisted force.

(i) Logical or procedural system/model changes introduced by mobilization/wartime policies (e.g., changing ETS to duration + 6 months, easing MOS assignment limitations).

(j) Identification of the subsets of the total mobilized enlisted population that will be forecasted and tracked.

(k) Identification of sources of information to be used for the actual and simulated modes of operation; i.e., an actual national emergency requiring partial or full mobilization of a "what if" excursion for mobilization planning in peacetime.

(l) ADP and telecommunications support will be provided by USAMSSA's main frames distributed processors and communication networks. The contractor must provide in section 5 of the FD an assessment of existing and planned hardware and communications capabilities to support the proposed system and identify new equipment/communication necessary to implement the proposed system as described in section 2 of the FD.

(m) Contractor must provide in section 5 of the FD appropriate cost estimates for

implementation of the proposed system as described in the FD to include hardware, communications, and software development. Total estimated cost must be broken down into appropriate sub-system/modules to allow for incremental development and implementation if required by the government.

APPENDIX C

REFERENCES

1.2.1 Contractual Documents.

a. Phase I - Develop and deliver to the COTR six months from the effective date of the contract award (29 September 1981) a Functional Description, System Specification and Data Requirements Document for the Enhancement of FORECAST as an Automated Aid to Enlisted Manpower Planning in Simulated or Actual Mobilization Conditions, Contract Number MDA903-81-C-0649, 29 September 1981.

b. Phase II (Optional Services). Develop Computer Software for FORECAST Mobilization Planning Capabilities (After Acceptance by HQDA of Phase I Products), Contract Number MDA903-81-C-0649, 29 September 1981.

1.2.2 Previously Developed Documentation with Application to this Project.

a. "ELIM-COMPLIP System Documentation, Volume 1-10", General Research Corporation, March 1980.

b. Functional Description for the Military Occupational Specialty Enlisted Strength and Personnel Management Forecasting System", General Research Corporation, Report 1075-03-79-CR.

c. System Specifications for the Military Occupational Specialty Enlisted Strength and Personnel Management Forecasting System, General Research Corporation, Report 1075-02079-CR.

d. FORECAST Casualty-Loss Methodology Study Report, ASM Programming Services Associates, Inc., 20 October 1981.

e. Feasibility of Predicting Reserve Show Rate at Mobilization Study Report, Strategic Studies Institute, Army War College, 18 July 1979.

f. Identification of Manpower Requirements for New Systems and Incorporation of the Requirements into PERSACS, Contract Number MDA903-80-C-0319.

g. Wartime Manpower Program System, Final Report, General Research Corporation, November 1980.

h. Review and Analysis of Recent Mobilization and Deployments of US Army Reserve Components, Research Analysis Corporation, October 1962.

i. DA Pamphlet 20-211: The Personnel Replacement System in the United States Army, August 1954.

j. DA Pamphlet 20-212: History of Military Mobilization in the United States Army, 1775-1945, November 1955.

k. US Army in the Korean War (Policy and Direction: The First Year), Office of the Chief of Military History, 1972.

l. Manpower for Military Mobilization, by Kenneth J. Coffey, American Enterprise Institute, 1978.

1.2.3 Standards of Reference Documentation

a. DOD Standard 7935.1S "Automated Data Systems Documentation Standards, 13 September 1977.

b. Guidance for Contractor Developmental Work at USAMSSA, 12 June 1978.

c. DOD 1100.19H, Wartime Manpower Program Guidance, 15 September 1980.

d. DOD Directive 1100.18, Wartime Manpower Planning, 26 August 1980.

e. DOD Instruction 1100.18, Wartime Manpower Program Policies and Procedures, 8 September 1980.

1.2.4 Other References.

a. The Army Strength and Personnel Management Data Forecasting System (FORECAST), an Overview of the System, 1 April 1980, Colonel E. R. Guthrie, FORECAST Project Manager.

b. Mobilization and Deployment Handbook, HQDA, Office of the Deputy Chief of Staff for Operations, Washington, D.C., July 1980.

c. Army Mobilization Plan (AMP), Volume I, HQDA, Office of the Chief of Staff, Washington, D.C., 24 July 1981.

d. Mission Element Needs Statement (MENS), HQDA, Office of the Deputy Chief of Staff for Personnel, Washington, D.C., 15 October 1980.

APPENDIX D

TERMS, ABBREVIATIONS, AND ACRONYMS

TERMS, ABBREVIATIONS, AND ACRONYMS

AAMMP	Active Army Military Manpower Program
ADT	Active Duty for Training
AIT	Advanced Individual Training
AR	Army Regulation
ARNG	Army National Guard
ARPRINT	Army Program for Individual Training
ASI	Additional Skill Indicator
ATC	Army Training Center
ATRRS	Army Training Requirement and Resources System
AUS	Army of the United States
BCT	Basic Combat Training
BRC	Budget Review Committee
BT	Basic Training
CA	Combat Arms
CAA	Concepts Analysis Agency
CAS	Civilian-Acquired Skills
CGD	Characteristic Group Designator
C-Group	Characteristic Group
CMF	Career Management Field
COMPLIP	Computation of Manpower Programs Using Linear Programming
CONUS	Continental United States
COTR	Contracting Officer's Technical Representative
CTS	Cohort Targeting System
DA	Department of the Army

DBMS	Data Base Management System
DEP	Delayed Entry Program
DEROS	Date Eligible to Return from Overseas
DFR	Dropped from Rolls
DMOS	Duty Military Occupational Specialty
DMS	Display Management System
DOD	Department of Defense
EDP	Expeditious Discharge Program
EFMP	Enlisted Force Management Plan
ELIM	Enlisted Loss Inventory Model
EMF	Enlisted Master File
EPMD	Enlisted Personnel Management Directorate
EPMS	Enlisted Personnel Management System
ES	End Strength
ETS	Expiration of Term of Service
FD	Functional Description
FDM	Factor Development Module
FORDIMS	Force Development Integrated Management System
FORECAST	Enlisted Strength and Personnel Management Data Forecasting System
FORSCOM	Forces Command
FSA	Force Structure Allowance
FY	Fiscal Year
FYDP	Five Year Defense Program
FYGP	Fiscal Year Group
GLF	Gain/Loss Transaction File

GRC	General Research Corporation
GYMP	Year-Group Management Data Base
HQDA	Headquarters, Department of the Army
HSDG	High-School-Diploma Graduate
IBM	International Business Machines
IET	Initial Entry Training
INDIV	Individual
ING	Inactive National Guard
IPM	Inventory Projection Module
IRIS	Information Retrieval and Inquiry System
LP	Linear Programming
MACOM	Major Command
MC	Mental Category
ME	Month End
MGT	Management
MILPERCEN	Military Personnel Center
MOS	Military Occupational Specialty
MOSLS	MOS-Level System
MY	Man-Years
NCO	Noncommissioned Officer
NG	National Guard
NHSDG	Non-High School Diploma Graduate
NPS	Non-Prior Service
OASA(M&RA)	Office of the Assistant Secretary of the Army (Manpower and Reserve Affairs)
ODCSOPS	Office of the Deputy Chief of Staff for Operations and Plans

ODCSPER	Office of the Deputy Chief of Staff for Personnel
OJT	On-the-Job Training
OSD	Office of the Secretary of Defense
OTRA	Other than Regular Army
PBG	Program and Budget Guidance
PCS	Permanent Change of Station
PERSACS	Personnel Structure and Composition System
PIA	Personnel Inventory Analysis
PIR	Pretrained Individual Reservists
PMOS	Primary Military Occupational Specialty
POM	Program Objectives Memorandum
PS	Prior Service
QDPM	Qualitative Data Processor Module
QFAC	Qualitative Factor Development Program
QFDM	Qualitative Factor Development Module
RA	Regular Army
RC	Reserve Components
REASG	Reassignment
RECLAS	Reclassification
REENL	Reenlistment
REQUEST	Recruit Quota System
RFG	Rate/Factor Generator
RTMC	Return to Military Control
SACS	Structure and Composition System
SAG	Study Advisory Group
SBR	Standby Reserve

SMA	Sergeant Major Academy
SMM	System Management Module
SNDB	Small Numeric Data Base
SQI	Special Qualifications Identifier
SS	System Specifications
SSN	Social Security Number
TAADS	The Army Authorization Documents System
TDP	Trainee Discharge Program
THS	Transients, Holdees, and Students
TIG	Time in Grade
TIS	Time in Service
TNG	Training
TRADOC	Training and Doctrine Command
TTHS	Trainees, Transients, Holdees, and Students
USAMSSA	United States Army Management System Support Agency
USAR	US Army Reserve
USAREC	US Army Recruiting Command
VFDMIS	Vertical Force Development Management Information System
YG	Year-Group
YOS	Years of Service

APPENDIX E

LIST OF HQDA AND MILPERCEN PERSONNEL WHO
SUPPLIED INFORMATION CONCERNING REQUIREMENTS
FOR MOBILIZATION PLANNING USING FORECAST

ASSISTANT SECRETARY OF THE ARMY
(Manpower and Reserve Affairs)

Berquist, Kenneth P., Mr.*
Deputy for Mobilization and Analysis
697-2818

Guthrie, Edward R., COL
Procurement, Education, Research
and Training
697-8201

Curtis, William A., LTC
Contracting Officer's Technical
Representative
697-0876

Woods, Luther L., LTC*
Reserve Force and Mobilization
Division
695-9654

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* The asterisk indicates persons who were participants in the initial planning conference or in information briefings given to selected members of the study team.

OFFICE OF THE DEPUTY CHIEF OF STAFF
FOR OPERATIONS

Directorate of Operations, Readiness, Mobilization

Army Mobilization Planning System Division	Tredway, Robert N., COL* Chief 695-6464
Mobilization & Deployment Division	Elliott, Roy P., COL Chief 697-8842
Force Structure Management Division	Johnson, David, MAJ* 697-0614
Force Accounting & Systems Division	Crockett, W. R., LTC* 694-5130
	Bell, D., LTC* 694-5081

* The asterisk indicates persons who were participants in the initial planning conference or in information briefings given to selected members of the study team.

OFFICE OF THE DEPUTY CHIEF OF STAFF
FOR PERSONNEL

Directorate of Personnel Plans & Systems	Forte, Johnie, Jr., BG* Director 697-7428
Mobilization Division	Ludden, H. Rowland, Dr.* Chief 697-8726
	Edwards, Charles A., COL Chief, Retiree Recall & Pre-assignment Team 697-1357
	Angle, T. Lane, LTC* Chief, Program & Analysis Team 697-8717
	Kirby, J. D., LTC Program & Analysis Team 697-8721
	Faucette, J. E., LTC Chief, Plans and Evaluastion Team 697-8732
	Cheek, John, Mr.* Program & Analysis Team 697-8721
	Rea, Thomas E., III, LTC* Executive, DPPS 697-7428

* The asterisk indicates persons who were participants in the initial planning conference or in information briefings given to selected members of the study team.

OFFICE OF THE DEPUTY CHIEF OF STAFF
FOR PERSONNEL

Directorate of Manpower, Programs & Budget	Mehl, Walter J., MG*, Director 695-4729
Military Strength Programs Division	Robinson, James C., Jr. COL Chief 697-3734
	Molepske, Robert L., LTC* Chief, Active Army Manpower Program Team 697-9403
	Johnson, John E., MAJ Chief, USAR Manpower Programs Team 695-2405
	Bricker, Earl M., III, CPT* USAR Manpower Programs Team 695-9251

* The asterisk indicates persons who were participants in the initial planning conference or in information briefings given to selected members of the study team.

OFFICE OF THE ADJUTANT GENERAL

Reserve Personnel Coordination Office	Lee, John, Mr.* 697-0924
	Bushey, H. W., Jr., MAJ* 697-0922
Organization & Management Planning Division	Smith, Steve, LTC* Plans Team 694-4671
RESERVE COMPONENTS PERSONNEL & ADMINISTRATIVE CENTER	Briggs, Charles F., BG* Commanding General AV 693-7701
Mobilization Plans & Requirements Office	Kauffman, L.E., LTC* Chief AV 693-7669
Operations Research & Analysis Division	Everett, Frank G., MAJ* Chief AV 693-7382

* The asterisk indicates persons who were participants in the initial planning conference or in information briefings given to selected members of the study team.

US ARMY MILITARY PERSONNEL CENTER

Personnel Plans & Operations Directorate

Plans & Systems Management Division	Green, Thomas, COL Chief 325-9310
	Sharp, John, MAJ Mobilization Plans Branch 325-9305
	Kelly, Larry, MAJ* 325-9305
	Robinson, Raymond C., Mr. 325-9305

Personnel Information Systems Directorate

Field Military Systems Division	Chappell, Ike, LTC* Chief 325-9403
	Clegg, D. W., Mr.* 325-9059
	Hruza, Doug, Mr.* 325-9410
Data Base Management Division	Boiles, Billy G., Mr.* 325-8894
	Lundeen, Christina* 325-8895
Plans & Requirements Division	Wilkinson, Bob, Mr.* 325-7552
HQDA Military Systems Division	Woodside, Hal E., Mr.* Technical Operations Branch 325-0019

* The asterisk indicates persons who were participants in the initial planning conference or in information briefings given to selected members of the study team.

US ARMY MILITARY PERSONNEL CENTER

Enlisted Personnel Management Directorate

Enlisted Distribution Division	Prentice, Leland, E.* Chief 325-8427
	Cameron, Rod, LTC* 325-8429
	Craven, D., LTC* Chief, Mobilization Planning Office 325-8979
	Strafer, Ken, MAJ* 325-8429
Accession Management/Training Assignment Division	McCarthy, William J., COL* Chief 325-8467
	German, Barbara* 325-8478
	Gendron, J. T., MAJ* 325-8478
	Roberts, T., LTC* 325-7573
	Milling, J.S., MAJ* 325-7573
	Oehrlein, R., LTC* 325-7573

* The asterisk indicates persons who were participants in the initial planning conference or in information briefings given to selected members of the study team.

APPENDIX F

PERSONNEL POLICY ALTERNATIVES IN MOBILIZATION

PERSONNEL POLICY ALTERNATIVES IN MOBILIZATION

BACKGROUND

The GRC study conducted research on mobilization by review of current and historical literature and conduct of interviews. The purpose of this research was to:

- Identify the spectrum of mobilization policies that affect FORECAST functional information requirements.
- Identify the impacts of mobilization on FORECAST functional information requirements.
- Identify the data sources to provide necessary input to forecasting functions under mobilization conditions.

This appendix presents the general framework for addressing the mobilization issues and the resulting spectrum of policy alternatives.

METHOD OF APPROACH

Recognizing the need for flexibility to respond to unanticipated conditions and to avoid overly restricting the system to specific, predefined policy decisions, GRC has identified mobilization issues which will impact FORECAST, together with a realistic spectrum of policies related to these issues. Fundamental to the identification of policy alternatives is the type of mobilization in effect.

The three types of mobilization considered are partial, full and total. The characteristics of each are:

- <u>Partial</u>. Mobilization in which forces and individuals beyond the current peacetime Active Army, but less than all Reserve units, serve on active duty.
- <u>Full</u>. Mobilization in which the total 24-division force supporting a European (NATO) scenario is activated, involving the Active Army, eight National Guard Divisions, other National Guard and Reserve units, and the private industrial sector.

- <u>Total</u>. Mobilization in which the entire country is mobilized.

Examining the types of mobilization facilitates the identification of mobilization issues and the resulting spectrums of mobilization policies related to these issues. The types of mobilization provide a starting point for the identification of issues; however, the policy alternatives are applied without specific tie-in to a given type of mobilization. That is, the spéctrum of policy alternatives supports each type of mobilization.

Mobilization policy alternatives are further influenced by:

- Intensity
- Type of conflict
- Anticipated duration

These variables apply to each type of mobilization in effect. Figure F.1 depicts the general relationship among these variables, the type of mobilization, the issues to be considered, and the policy decision process.

The spectrum of policy alternatives is based on the concept that the intensity, duration, and type of conflict associated with each type of mobilization is going to drive the types of policy decisions made. The following discussions of mobilization issues are not exhaustive and are not intended as the predicted sequencing of policy alternatives. Rather, these are issues which should be recognized as realistic considerations in the design of the forecasting system(s).

MOBILIZATION ISSUES

The mobilization issues which are presented in this section include:

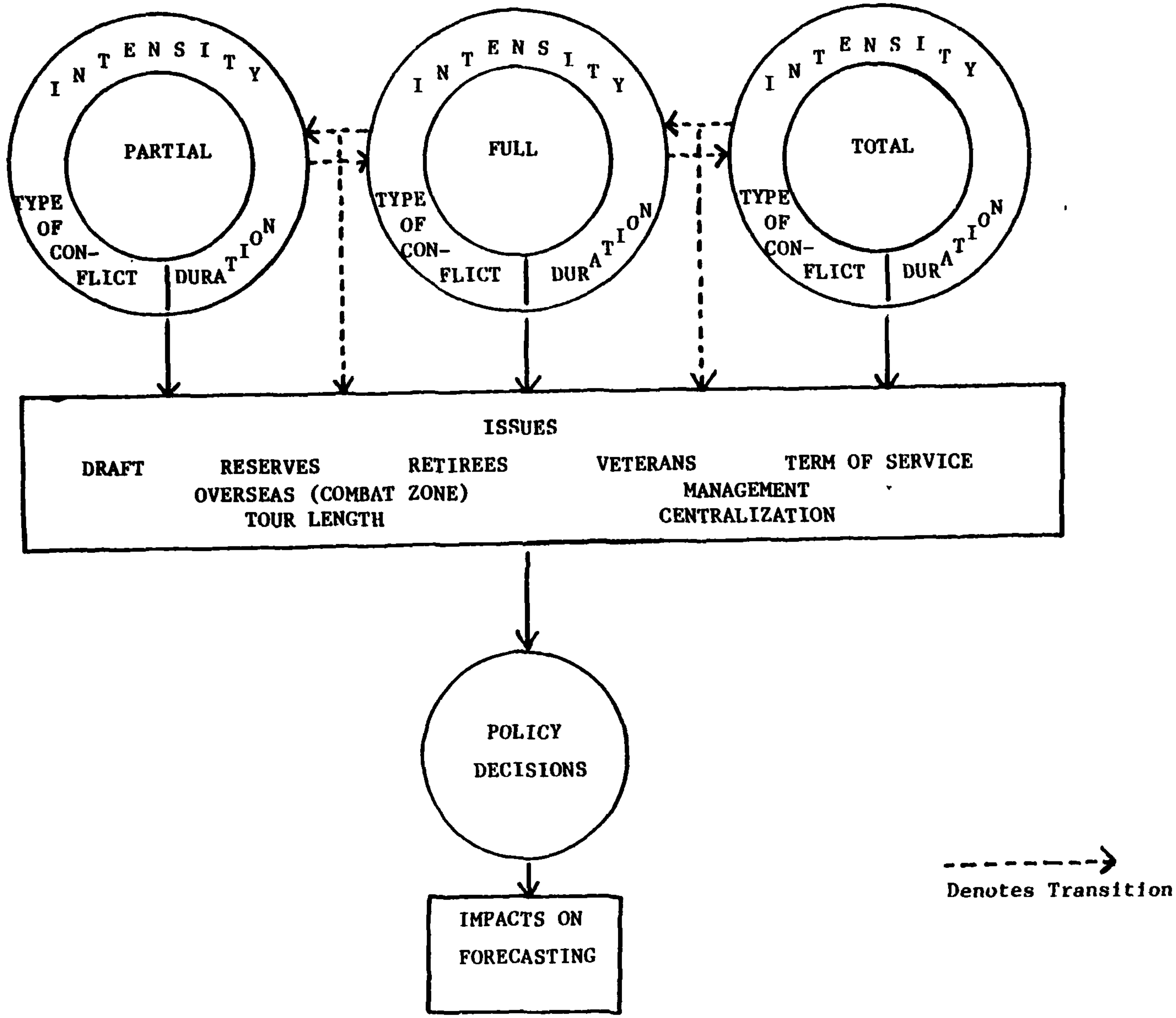


Figure E.1. Mobilization Policy Alternatives and Relationships

- Use of the draft
- Reserve call-up
- Recall of retirees and/or veterans
- Term of service
- Overseas (combat zone) tour length

Figure F.2 identifies the extreme points on the spectrum of policy alternatives related to these issues. A more detailed description of the spectrum of policy alternatives for each issue is presented below. No attempt is made to predefine the exact combination of policy decisions under each type of mobilization.

Draft

The range of policy alternatives regarding use of the draft include:

- No draft
- Registration, men
- Registration, women
- Draft men, lottery system
- Draft women, lottery system
- Draft all eligible men
- Draft all eligible women

Additional considerations include drafting for specific MOSs, e.g., combat army only, drafting only in selected critical skills, and drafting in bulk numbers.

Reserve/National Guard Call

The Reserve forces of the Army comprise several categories of personnel: ARNG and USAR Selected Reserves, Standby Reserve and the Individual Ready Reserve (IRR) and the Inactive National Guard (ING). Table F.1 contains information on the Reserve Forces categories.

Issue	Extreme Points on Spectrums of Policy Alternatives	
Draft	No Draft ----------	Draft all eligible men & women
Reserve Call Ready Reserve Standby Reserve Retired Reserve	0% ----------------	100%
Retirees	0% ----------------	100%
Veterans	0% ----------------	100%
Term of Service	Current Contract ___________	Indefinite Contract
Oversea (Combat Zone) Tour Length	Set Tour Length -----------	Indefinite Length plus 6 months
Degree of Management Centralization	Highly Centralized ______________	Highly Decentralized

Figure E.2. Mobilization Planning Alternative Extreme Points

TABLE E.1

EXTRACT OF AUTHORIZED RESERVE COMPONENT CATEGORIES

RESERVE COMPONENT CATEGORY						
	RESERVE CATEGORY	TRAINING PAY/ RET/CATEGORY	COMPRISED OF	MINIMUM NUMBER OF PERIODS OF IDT REQUIRED ANNUALLY WITH PAY	NUMBER OF DAYS OF ADT REQUIRED ANNUALLY WITH PAY	REMARKS
READY RESERVE	SELECTED RESERVE (Units and individuals)	A	Units of the Selected Reserve	48	For Reserves: Not less than 14 exclusive of travel time. For Guard: 15 including travel time.	
			Individual members of the Selected Reserve	48	12 to 14 exclusive of travel time.	
	CODES	B	Unit and individual members of the Selected Reserve	24	12 to 14 exclusive of travel time.	
	S = Unit T = Nonunit U = Tng Pipeline M = Mil Tech. F = FTS-AGR	C	Unit and individual members of the Selected Reserve	12	12 to 14 exclusive of travel time.	
		D	[redacted] individual members of the Selected Reserve	0	12 to 14 exclusive of travel time.	
		T	ROTC Cadets who are members of Selected Reserve Units	48	For Reserves. Not less than 14 exclusive of travel time. For Guard: 15 including travel time.	
		F	Nonprior service personnel currently on initial active duty for training.	0	Not less than 4 months.	
		P	Nonprior service personnel awaiting IADT (with pay)	N/A	0	
		Q	Nonprior service personnel awaiting the second part of their Initial Active Duty for Training	N/A	0	
		U	Nonprior service personnel serving on the second part of their Initial Active Duty for Training	0	AS REQUIRED	
	FULL TIME SUPPORT (FTS) ACTIVE GUARD AND RESERVE (AGR) PERSONNEL		Unit and individual members of the Selected Reserve	N/A	N/A	
	INDIVIDUAL READY RESERVE (IRR)	E	Individual members of the Ready Reserve	0	Not more than 30.	ADT may be performed with or without pay.
		H	Individual members of the Ready Reserve	0	0	
	CODE. R	V	Direct enlistment to the IRR requiring periodic refresher training	0	14	
		I	Inactive Army National Guard	0	0	
		J	Members of the Ready Reserve participating in officer training programs	0	As required by the officer training program.	
		K	Members participating in the Armed Forces Health Scholarship program	0	45	
		L	Nonprior service personnel awaiting IADT (without pay)	0	0	Use Reserve category "U"
STANDBY	STANDBY STATUS	1	Key employees in the Standby Reserve (Active Status List)	0	0	May perform voluntarily for retirement points and affiliate for this purpose with units of the Selected Reserve.
	CODE Y	2	Other members of the Standby Reserve on the Active Status List	0	0	
		3	Members of the Inactive Standby Reserve	0	0	No training or pay authorized.
RETIRED	RETIRED RESERVE	1	Drawing Reserve Retired Pay under 10 USC 1331	N/A	N/A	
	CODE V	2	Drawing Reserve Retired Pay under other than 10 USC 1331 or other than reasons of physical disability	N/A	N/A	
		3	Not drawing Reserve Retired Pay but eligible at age 60	N/A	N/A	
		4	Not drawing Reserve Retired Pay but eligible at age 60 (discharged from the Reserve forces)	N/A	N/A	
		5	Not drawing Reserve Retired Pay and not eligible at age 60 (Honorary Retirees) (DoD Directive 1200.15 Section II paragraphs C.(3)(a) and C.(4))	N/A	N/A	
		6	Members of the Retired Reserve retired for reasons of physical disability (include members retiring under 10 USC 1209 in Code "3")	N/A	N/A	
		7	Reserve Officers and Enlisted members who have retired after 20 or more years of active duty	N/A	N/A	

Page 4

The range of policy alternatives applies to all categories of the Reserves and the National Guard. The alternatives include:

- Call no Reserve Forces
- Call selected units
- Call selected individuals
- Call all units
- Call all individuals,

Retirees

The range of policy alternatives related to veterans includes:

- No veterans called
- Veterans with less than 6 years of service called
- Veterans with selected skills called
- All veterans called

Term of Service

The policy alternatives, and combinations of alternatives relating to the term of service, will be determined based on:

- Type of mobilization
- Intensity, duration, type of conflict
- Pools of personnel serving

Term of service policy alternatives include:

- Complete initial contract (Active Army and Reserves)
- Short-term contract or extension of initial contract
- Long-term contract or extension of initial contract
- Indefinite contract or extension of initial contract

This range of policy alternatives applies to each category of personnel: Active Army, Reserves, Draftees, Retirees, and Veterans. The terms of service--combination of alternatives--may be different for

each category. For example, in the event of a mid-intensity, anticipated 12-month partial mobilization, the following alternatives might be selected if all categories of personnel are serving:

Active Army	Selected Reserve	NG	IRR	Active SBR	Draftees	Inactive SBR	Retired Reserve	Retirees	Veterans
← Short-term extension of initial contract →			← Complete initial contract →		2 yr. short-term contract	Selected personnel 1 yr. short-term contract			

Oversea (Combat Zone) Tour Length

The range of policy alternatives related to OS tour length are driven by:

- Type of mobilization
- Intensity, anticipated duration, and type of conflict
- Pools of personnel serving

The OS tour length policy alternatives include:

- Serve no terms at conflict area
- Serve specified time at conflict area and discharge
- Serve specified time at conflict area and remainder of terms of service in CONUS and/or nonconflict oversea area
- Serve several tours at conflict area
- Utilization of point system
- Serve indefinite tour at conflict area

As with the term-of-service policy alternatives, all oversea tour length alternatives apply to each category of personnel serving. The alternatives applied to each category, however, may be different for each category. Using the previous example of a mid-intensity, anticipated 12-month partial mobilization, in which all categories of personnel are serving, the following example of oversea tour length may

apply:

Active Army / Selected Reserves / NG	IRR / Active SBR	Draftees	Inactive SBR / Retirees	Retired Reserve / Veterans
← Serve specified term at conflict area if ETS>12 months, otherwise serve no term at conflict area →	← Serve no term at conflict area →	Serve specified term at conflict area and discharge	Selected personnel serve specified term in conflict area and discharge	Serve no term at conflict area

SUMMARY

The specific policy decisions and combinations of policy decisions which will impact FORECAST will be determined by:

- Type of mobilization
- Intensity, anticipated duration, and type of conflict

Several issues will have to be addressed in a mobilization environment to include the use of the draft, Reserves, retirees, veterans, term of service, OS (combat zone) tour length, and degree of management centralization. Under each issue, there are several policy alternatives which are related not only to the above considerations, but which are highly interrelated with each other.

The spectrums of policy alternatives identified under each issue are not exhaustive. These are realistic policy alternatives which must be considered in the design of the forecasting system.

APPENDIX G

ELIM-COMPLIP EXECUTIVE BRIEFING

Report 1131-04-80-CR

ELIM-COMPLIP | Enlisted Loss Inventory Model—Computation of Manpower Programs Using Linear Programming

Executive Briefing

July 1980

By:

John W. Wright
Michael J. Maloney

Submitted To:

Maj. William A. Curtis
Office of the Assistant Secretary of the Army
(Manpower and Reserve Affairs)

Contract No: MDA903-79-C-0705

MANAGEMENT SYSTEMS DIVISION
GENERAL RESEARCH CORPORATION
A SUBSIDIARY OF FLOW GENERAL INC.
7655 Old Springhouse Road, McLean, Virginia 22102

ELIM-COMPLIP

GRC

ENLISTED LOSS INVENTORY MODEL — COMPUTATION OF MANPOWER PROGRAMS USING LINEAR PROGRAMMING

ELIM-COMPLIP, the Enlisted Loss Inventory Model--Computation of Manpower Programs Using Linear Programming--is a series of integrated computer-based mathematical models used by the Army to forecast personnel strengths. The system is used in the planning, programming and budget process and also permits users to explore the effects of changes to personnel programs as an aid in determining personnel policy. Each month new data are incorporated and a series of reports called the Active Army Military Manpower Program are produced. This program shows both the latest actual data available and projections calculated with rates and factors based on the latest data.

The purpose of this briefing is to introduce you to the ELIM-COMPLIP system, with an explanation of its capabilities and underlying assumptions, and of its role in the personnel planning, programming and budgeting process at HQDA and MILPERCEN.

USES OF ELIM-COMPLIP

PLANNING	OPERATING STRENGTHS
	TRAINING REQUIREMENTS
	RECRUITING FORCE
PROGRAMMING	FORECAST STRENGTHS
	ASSESS IMPACT OF CHANGES
BUDGETING	STRENGTH-RELATED COSTS
	MANPOWER AUTHORIZATIONS
POLICY DEVELOPMENT	IMPACT OF PROPOSED CHANGES
PROGRAM PROGRESS	LATEST STRENGTH
	COSTS
	DEVIATIONS IN RECRUITING
	STRENGTH PROJECTIONS
	ACCESSION REQUIREMENTS

2

Current uses of the system encompass the broad areas shown in this slide. ELIM-COMPLIP projects future operating strengths, permitting realistic force structure planning. The projection of accessions permits the Army to plan the size of the training base. Similarly, plans for the size of the recruiting force are developed in consideration of the forecasts of accession requirements.

In the programming function, the system provides the official forecast of Army strength and related information to support the Five Year Defense Program (FYDP). During the development of program decisions, ELIM-COMPLIP is run to serve as the basis for assessing the impact of changes in strength or other policies.

Strength projections and budget estimates of strength related costs are based on ELIM-COMPLIP. The strength projections provide the base for the Army's request for Congressional authorizations of military manpower.

Alternative runs of the system are made frequently to assess the impact of policy decisions being considered. Such decisions as changing reenlistment eligibility criteria can be made with greater assurance as to their effect by simulating the results in ELIM-COMPLIP.

USES OF ELIM-COMPLIP

GRC

PLANNING	OPERATING STRENGTHS
	TRAINING REQUIREMENTS
	RECRUITING FORCE
PROGRAMMING	FORECAST STRENGTHS
	ASSESS IMPACT OF CHANGES
BUDGETING	STRENGTH-RELATED COSTS
	MANPOWER AUTHORIZATIONS
POLICY DEVELOPMENT	IMPACT OF PROPOSED CHANGES
PROGRAM PROGRESS	LATEST STRENGTH
	COSTS
	DEVIATIONS IN RECRUITING
	STRENGTH PROJECTIONS
	ACCESSION REQUIREMENTS

The monthly update of the manpower program reflects the latest reported strengths. It serves as the basis for determining progress against goals in strength, gains, losses and other areas. Most importantly, this update shows the future implications of the latest actual data, including costs, deviations in recruiting, projections of future operating strength, and future accession requirments. ELIM-COMPLIP can be a vehicle to identify areas that need management attention.

BRIEFING OUTLINE

GRC

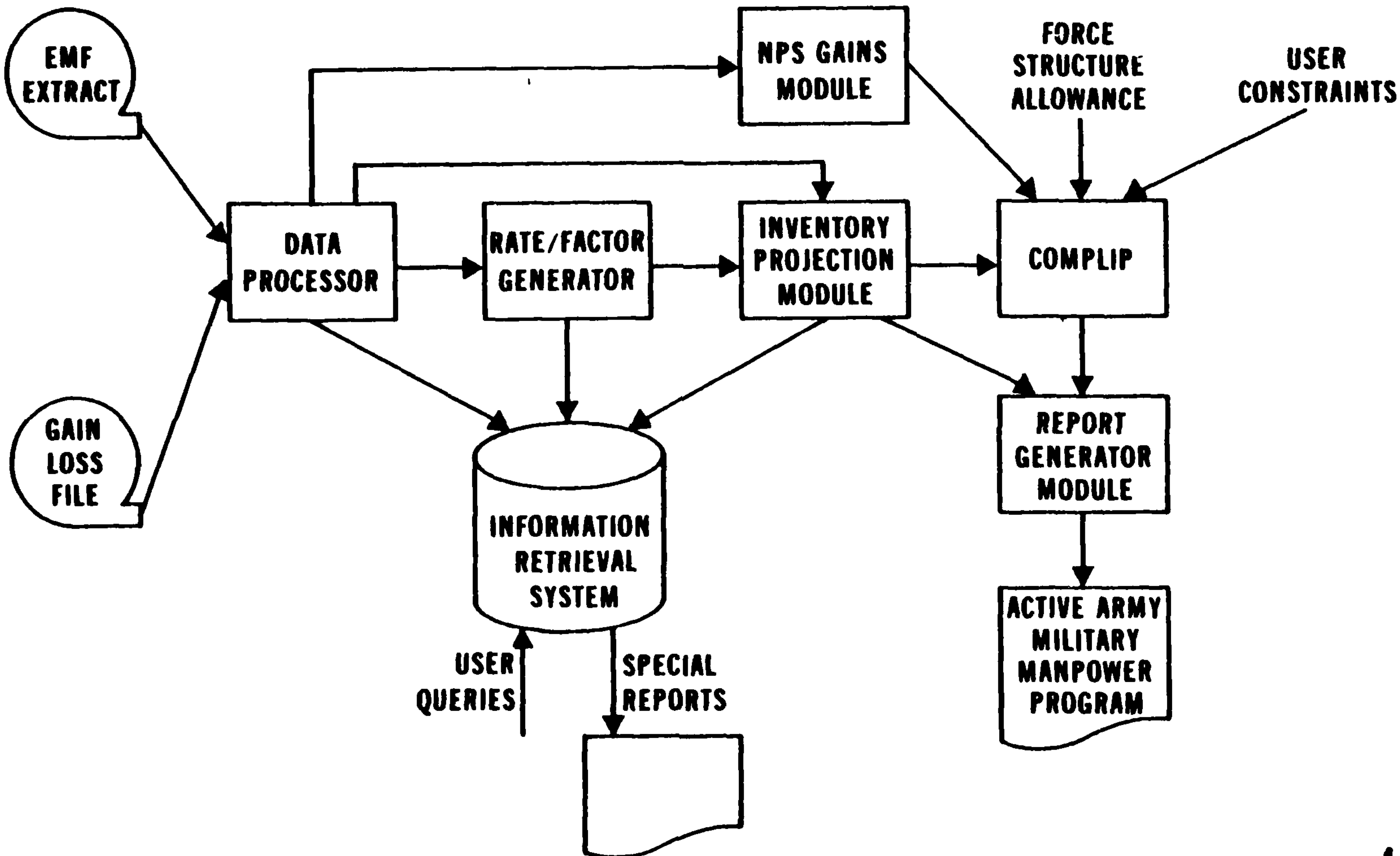
- INTRODUCTION
- SYSTEM OVERVIEW
- DATA ARRAYS
- DATA PROCESSOR
- RATE/FACTOR GENERATOR
- INVENTORY PROJECTION MODULE
- NPS GAINS MODULE
- COMPLIP (LINEAR PROGRAM MODULE)
- REPORT GENERATOR MODULE – AAMMP
- SUMMARY

The next slide shows an outline of the briefing. We will first look at the system as a whole, and at the basic data arrays involved. Then we will talk in more detail about each of the six major modules of the system: the Data Processor, the Rate/Factor Generator, the Inventory Projection Module, the Non-Prior-Service Gains Module, COMPLIP, which is the linear programming module, and the Report Generator Module, which produces the Active Army Military Manpower Program (AAMMP).

The overview of the system operation will include descriptions of the functions of the various modules and sample outputs of the manpower program. The briefing will be followed by a question and answer period. I encourage you to discuss your specific needs and concerns about ELIM-COMPLIP at that time.

Begun in the early 1970's, ELIM-COMPLIP was initially developed to project Army manpower strength and to estimate draft calls in order to better plan and budget military manpower. Since that time the system has been modified and enhanced to reflect changing manpower issues, to increase accuracy, and to provide additional capabilities. The current version of the system is known as ELIM-IV/COMPLIP-G4, representing the fourth major revision of the basic system. The current version of the system serves the needs of several offices besides DCSPER including the Office of the Assistant Secretary of the Army for Manpower and Reserve Affairs, DCSOPS, the Comptroller of the Army and MILPERCEN.

ELIM-COMPLIP SYSTEM SCHEMATIC



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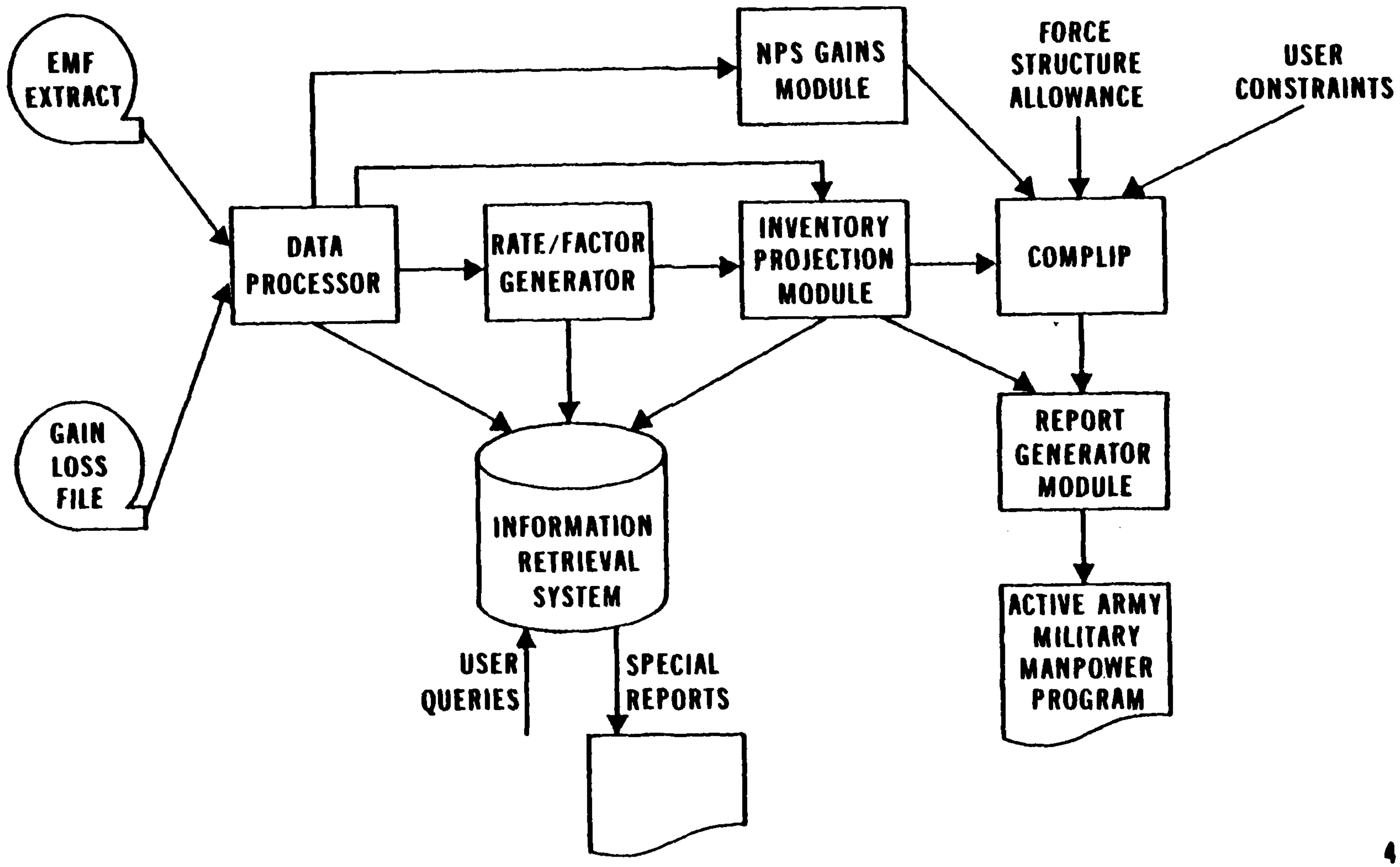
This is a simplified overview of the system. It contains six basic modules: the Data Processor, the Rate/Factor Generator, the Inventory Projection Module, the NPS Gains Module, the Linear Programming Module or COMPLIP, and the Report Generator. In addition, there is an Information Retrieval System, designed to produce special reports on demand.

The basic inputs used by ELIM-COMPLIP are extracts of the Enlisted Master File (EMF), the Gain/Loss Transaction File (GLF), and the Force Structure Allowance, or targets for the operating strength of the Army. The EMF and GLF extracts are provided monthly by MILPERCEN; The Force Structure Allowance is established by coordination between DCSPER and DCSOPS. The EMF and GLF establish a historical data base from which future gains and losses can be estimated: the Force Structure Allowance provides the "goal" in terms of Army Operating Strength which the model attempts to reach.

The Data Processor module updates the system data base monthly with the latest actual data. The Rate/Factor Generator uses the updated data base to generate new rates and factors for forecasting losses and other changes to the Army strength. The Inventory Projection Module then applies the new rates and factors to project losses and retention rates expected each month for up to seven years in the future.

ELIM-COMPLIP SYSTEM SCHEMATIC



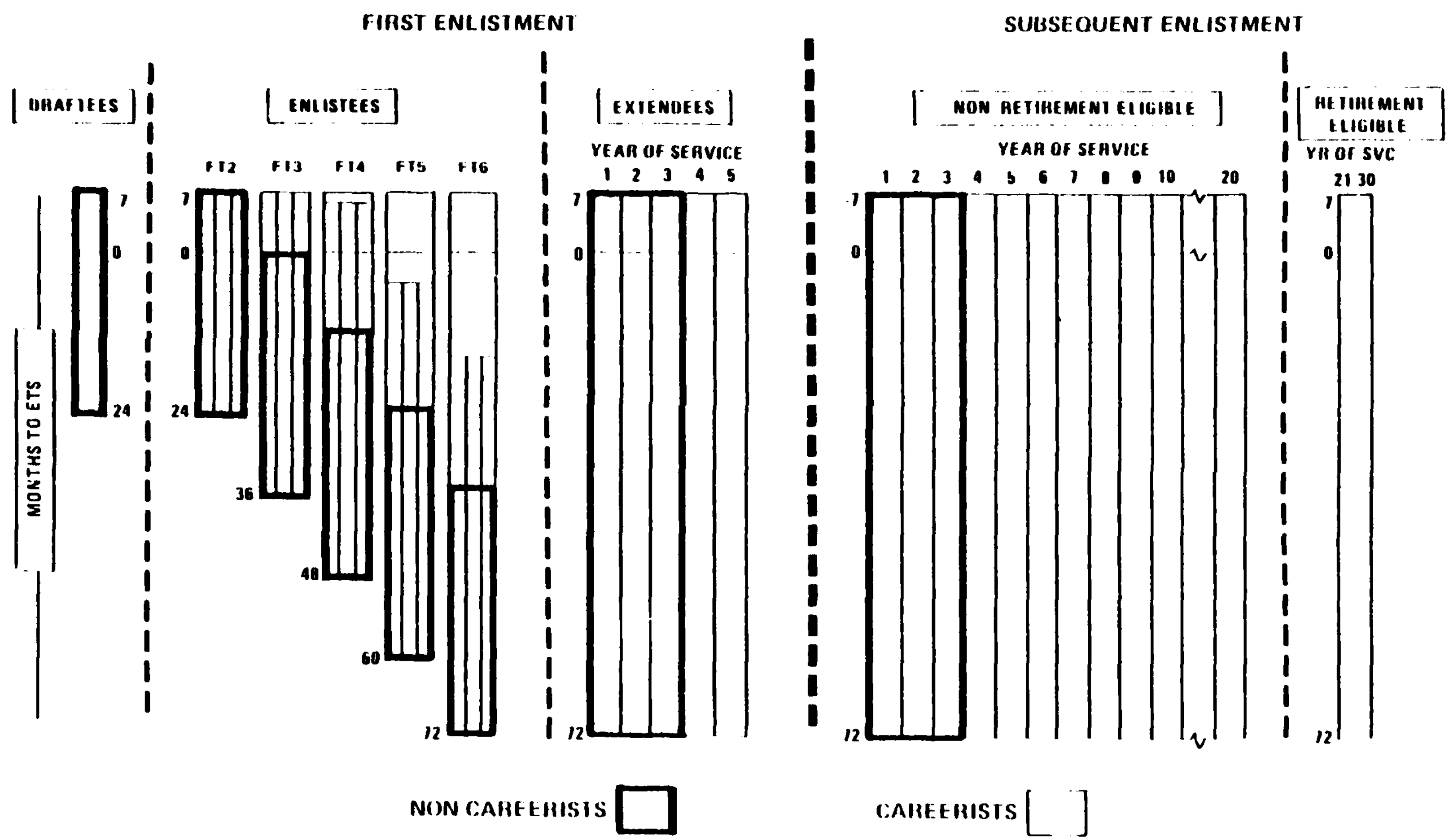
The COMPLIP Module uses linear programming techniques to produce an optimal gains strategy. The objective is to determine a monthly schedule of accessions that will minimize the deviation between the Army's projected operating strength and the target or Force Structure Allowance, while remaining within user specified constraints.

The end product is the Active Army Military Manpower Program (AAMMP), a series of reports produced by the Report Generator Module. These reports provide extensive strength and cost data pertaining to Active Army Military Manpower on a monthly basis for the current year, the budget year, and the five years contained in the Five Year Defense Program (FYDP).

The system operator can exercise various controls on the system, either to reflect the anticipated effects of actual policy changes or to simulate the effects of proposed policy changes.

DATA ARRAY

GRC



14

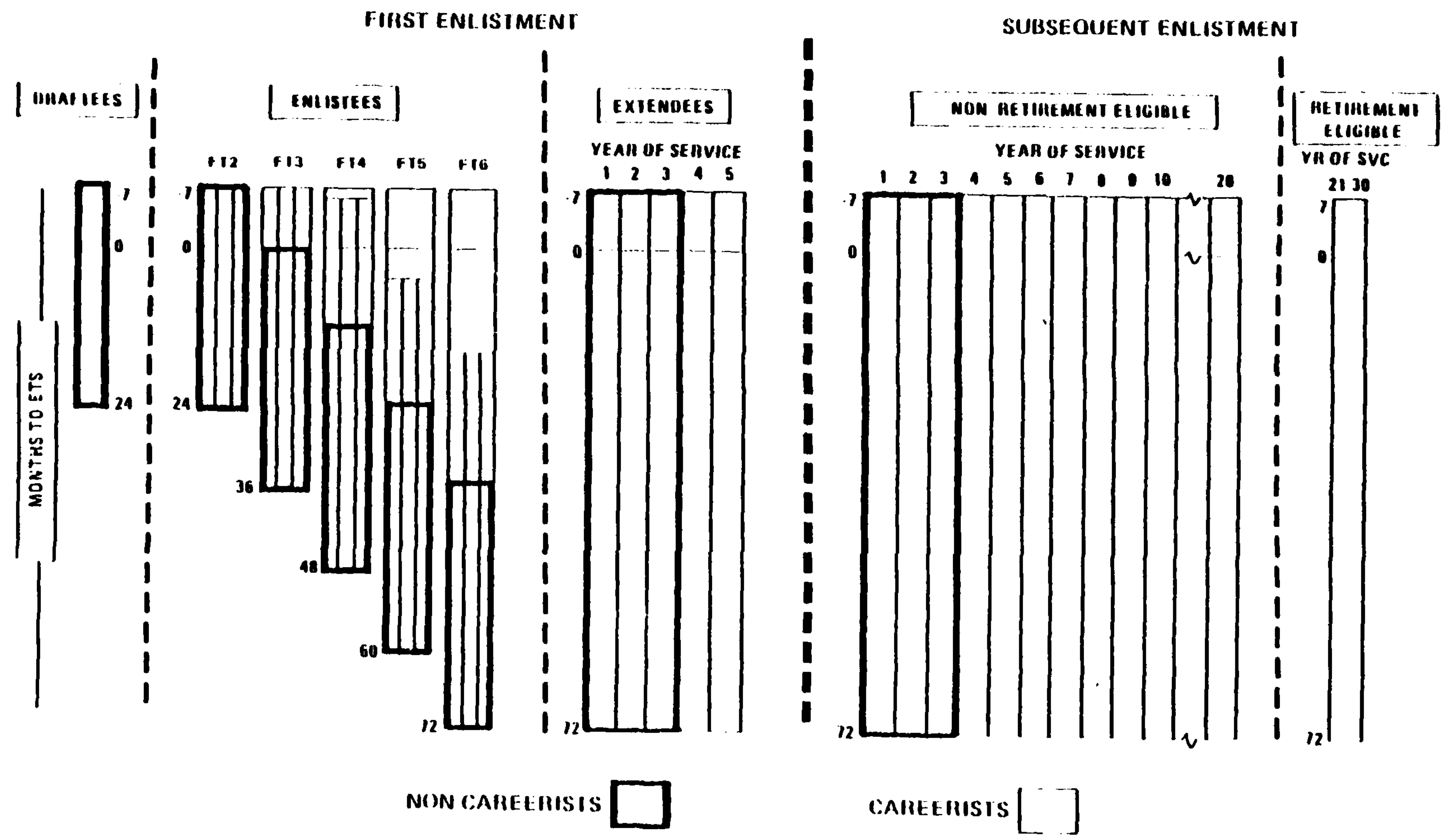
This next slide shows the data arrays that are produced by the Data Processor Module and used by the Rate Generator and the Inventory Projection Module. A number of different points should be noted.

Each horizontal row represents a value of months remaining to end of term of service (ETS). The row near the top labeled "0" represents counts of people who are in the last month of their term of service. The top row, labled "-7", represents counts of people who are 7 or more months past their ETS date. People still in the Army past their ETS date represent erroneous or late loss transactions, and also people who legitimately remain in the Army past ETS for medical or disciplinary reasons. The bottom row, labeled "72", represents people who have 72 or more months remaining to ETS.

The vertical columns represent various categories of Army enlisted personnel.

Each intersection of a row and a column is called a cell. For example, the cell in the lower right hand corner represents people with more then 20 years of service and 72 or more months to ETS. For each cell, the Data Processor generates counts of strength, gains, and losses. The gains and losses are broken out by type. For example, types of gains are Non-Prior-Service gains and reenlistments; types of losses are ETS losses and retirements. The data base contains such counts for each historical month, beginning in January 1972.

DATA ARRAY



16

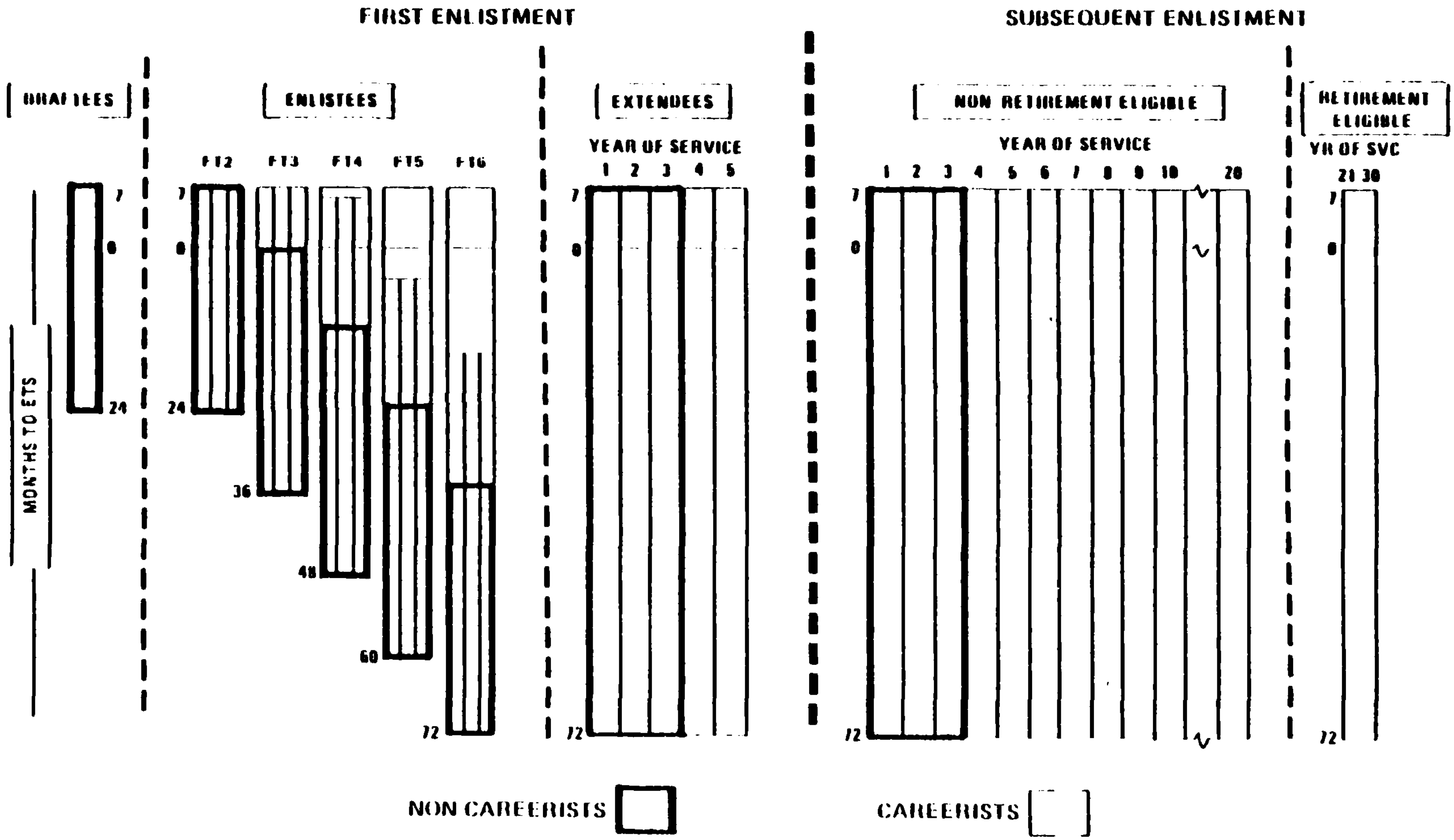
Now consider the vertical columns in more detail. There are three main groups: draftees, people in their first enlistment, and people who have reenlisted.

At present, the draftee population is zero, but the capability of including draftees in the model has been retained.

People in their first enlistment are divided into those still committed to their orignal ETS and those who have extended their ETS dates. Those still committed to their original ETS are broken out by term of enlistment, two to six years. Also, as indicated by the smaller vertical columns, they are broken out by demographic characteristics such as civilian education level, mental category, and sex. The user has considerable flexibility in defining these characteristic groups. The breakout by characteristic group is maintained for the first 55 months of service, or until the first reenlistment or extension, whichever comes first.

As shown, people who extend before their first reenlistment are kept in a separate array, broken out by years of service.

DATA ARRAY



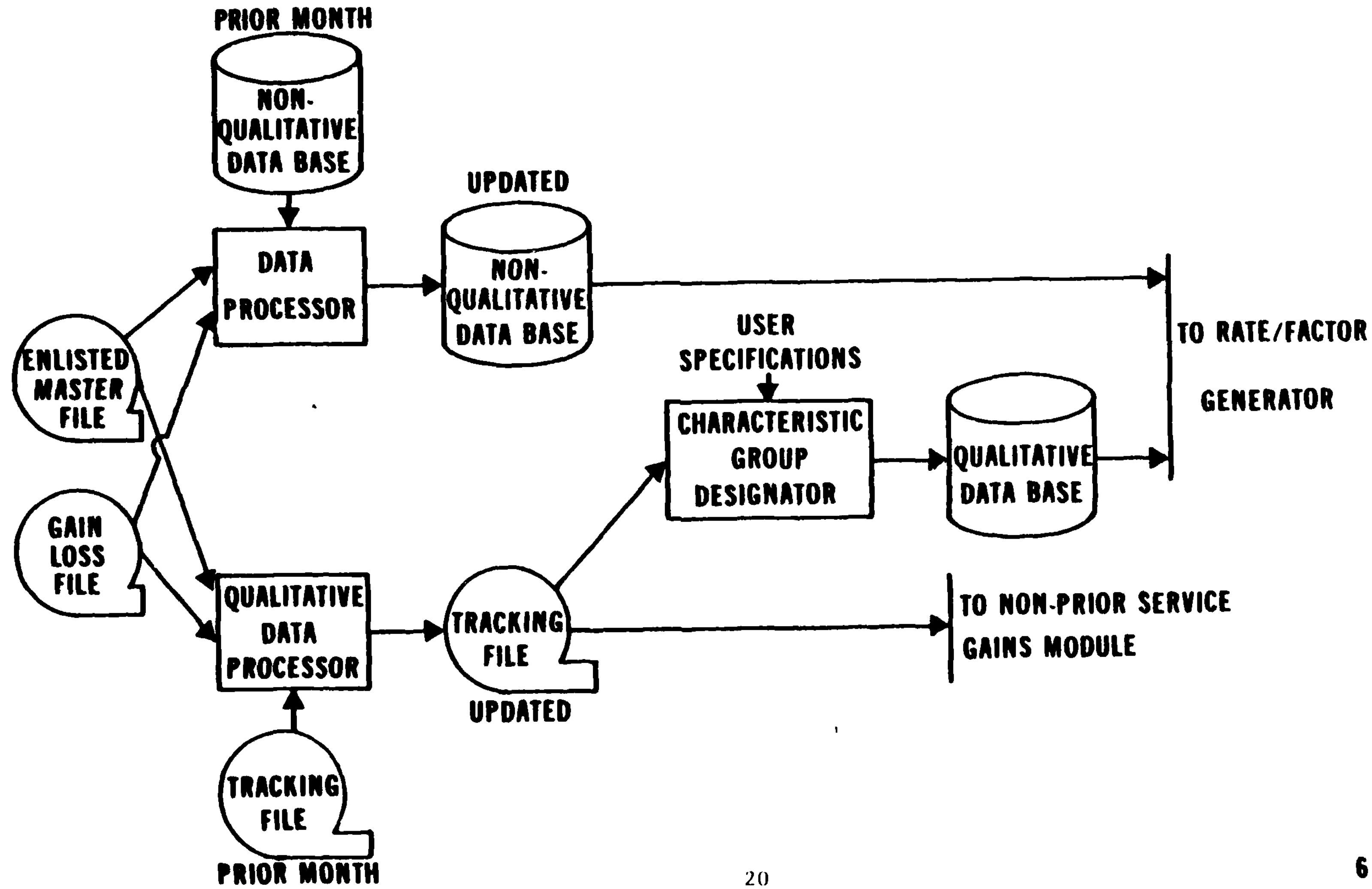
FIRST ENLISTMENT
SUBSEQUENT ENLISTMENT
DRAFTEES
ENLISTEES
EXTENDEES
NON RETIREMENT ELIGIBLE
RETIREMENT ELIGIBLE
MONTHS TO ETS
FT2
FT3
FT4
FT5
FT6
YEAR OF SERVICE
1 2 3 4 5
YEAR OF SERVICE
1 2 3 4 5 6 7 8 9 10 20
YR OF SVC
21 30
7
0
24
36
48
60
72
NON CAREERISTS
CAREERISTS

Finally, people who have reenlisted are kept in a separate array, broken out by years of service, from one year to twenty years, with a separate column for those who have completed more than twenty years of service and who are thus eligible to retire.

Now consider the heavy lines on the left side of each of the main groups. The Army has traditionally divided the enlisted force into non-careerists and careerist. Non-careerists are those in their first 36 months of service, while careerists are those with 37 or more months of service. Thus the heavy lines indicate the parts of the arrays that correspond to non-careerists.

DATA PROCESSOR MODULE SCHEMATIC

GRC



20

6

The next slide shows more details of the Data Processor Module. There are two inputs, the Enlisted Master File and the Gain/Loss File, and three data bases, the Non-Qualitative Data Base, the Tracking File, and the Qualitative Data Base. Each data base is updated monthly. The Non-Qualitative Data Base contains counts of strength, gains, and losses in data arrays shown on the previous slide, but without the breakout by characteristics such as civilian education, mental category, sex and race. The Tracking File does not contain counts. Instead, it contains one record for each person who has enlisted in the Army since January 1972. Each person's record contains selected demographic information and fields showing each gain or loss transaction for that person. The user specifies to the Characteristic Group Designator how characteristic groups are to be defined in terms of civilian education, mental cateogry, and so forth. The Characterstic Group Designator then reads the Tracking File and creates the Qualitative Data Base, which contains counts of individuals by characteristic group, months to ETS, and term of enlistment, up to the first 55 months of service or the first reenlistment or extension.

CHARACTERISTIC FILE DATA ELEMENTS

AFQT PERCENTILE

*RACE

*SEX

*TERM OF SERVICE

*CIVILIAN EDUCATION

*MENTAL CATEGORY

CAREER MANAGEMENT FIELD

AGE AT ENTRY

BPED

ETS

BASD

CURRENT ASSIGNMENT (COMMAND)

DUTY MOS

PMOS

PAY GRADE

CURRENT LOCATION

CURRENT STATUS

REENLISTMENT BONUS

ENLISTMENT OPTIONS

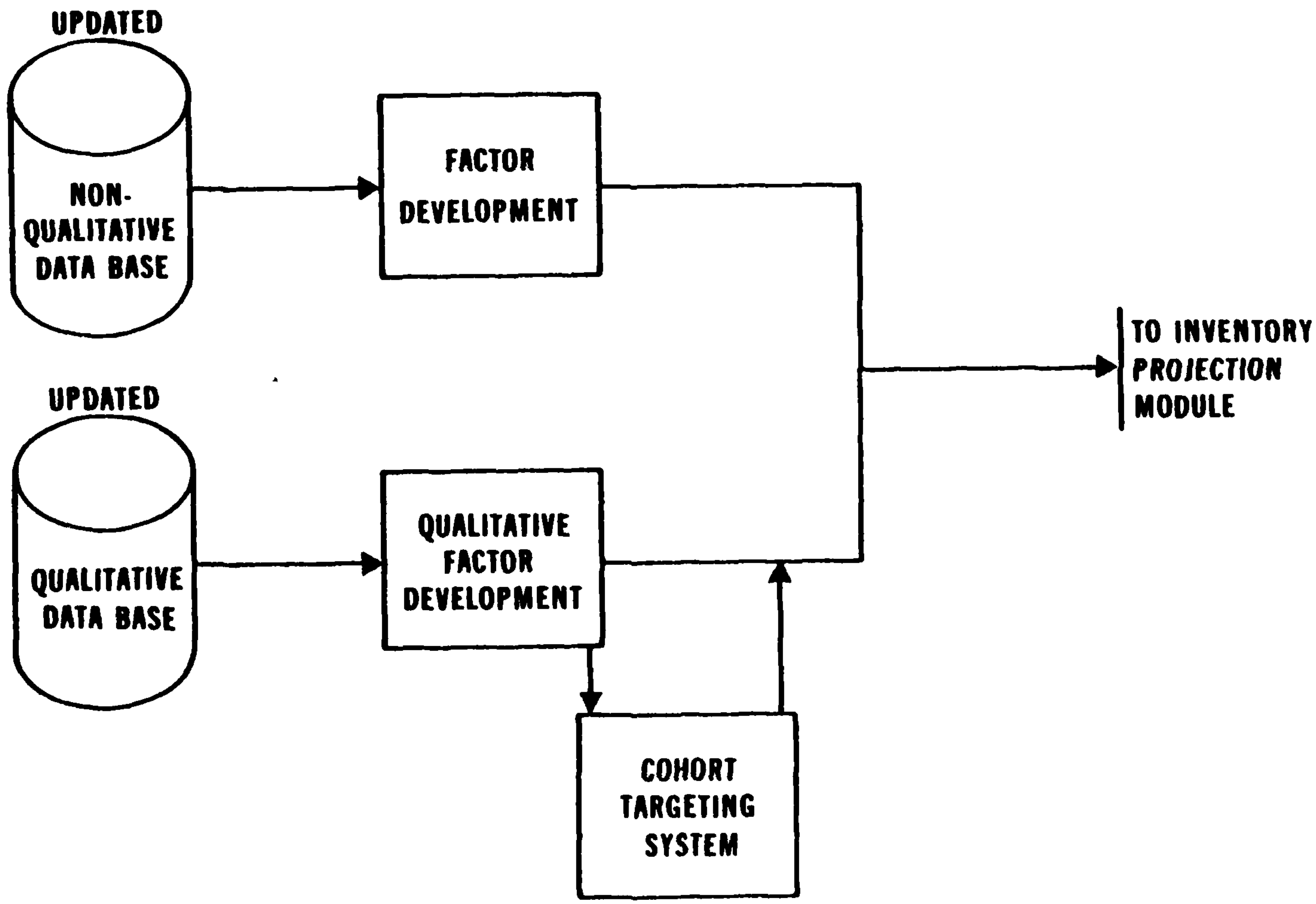
*MOST COMMONLY USED TO DEFINE CHARACTERISTIC GROUP

7

The next slide lists the data elements on the tracking file. In principle, almost any of these data items can be used in defining characteristic groups; in practice, the most commonly used characteristics are civilian education, mental category, sex, race, and term of service. The user can define up to 40 characteristic groups.

Partioning first term enlistees by characteristic group has explained and eliminated major variations in loss rates over time. It also helps greatly in projecting the effect of changes in the demographic mix of new enlistees.

RATE/FACTOR GENERATOR



8

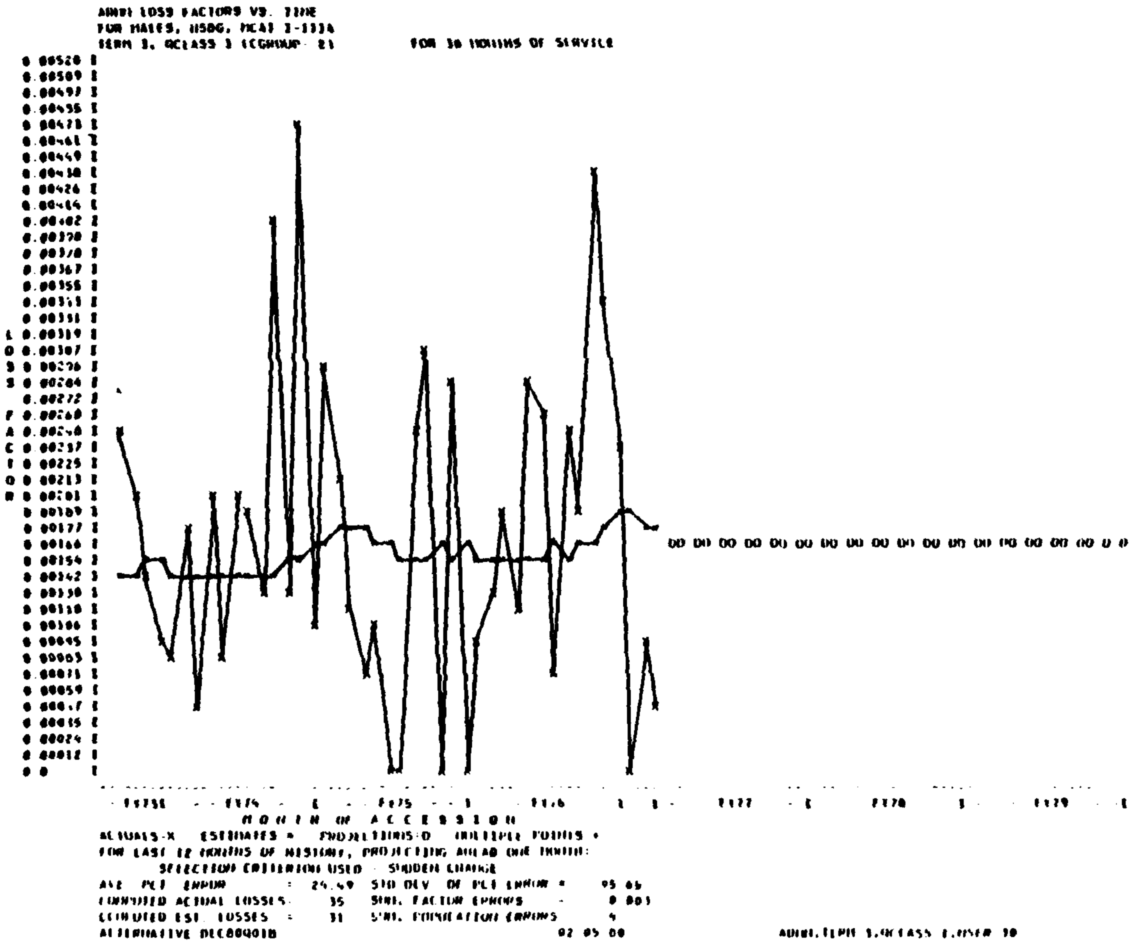
The next slide shows the components of the Rate/Factor Generator. This module uses historical time-series data from the data bases to develop loss rates and other factors needed by the rest of the system. The Rate/Factor Generator consists of two major components: the qualitative factor development program which computes factors for populations partitioned by characteristic group and the non-qualitative factor development program which computes factors for all other population cells.

Loss rate factors are projected monthly for a period of 7 years. User controls are available to modify projected loss rates when appropriate.

The system provides several methodologies to determine rates and factors, as well as techniques to deal with trends and projected changes in factors.

EXAMPLE OF AN RFG FORECAST USING EXPONENTIAL SMOOTHING

GRC

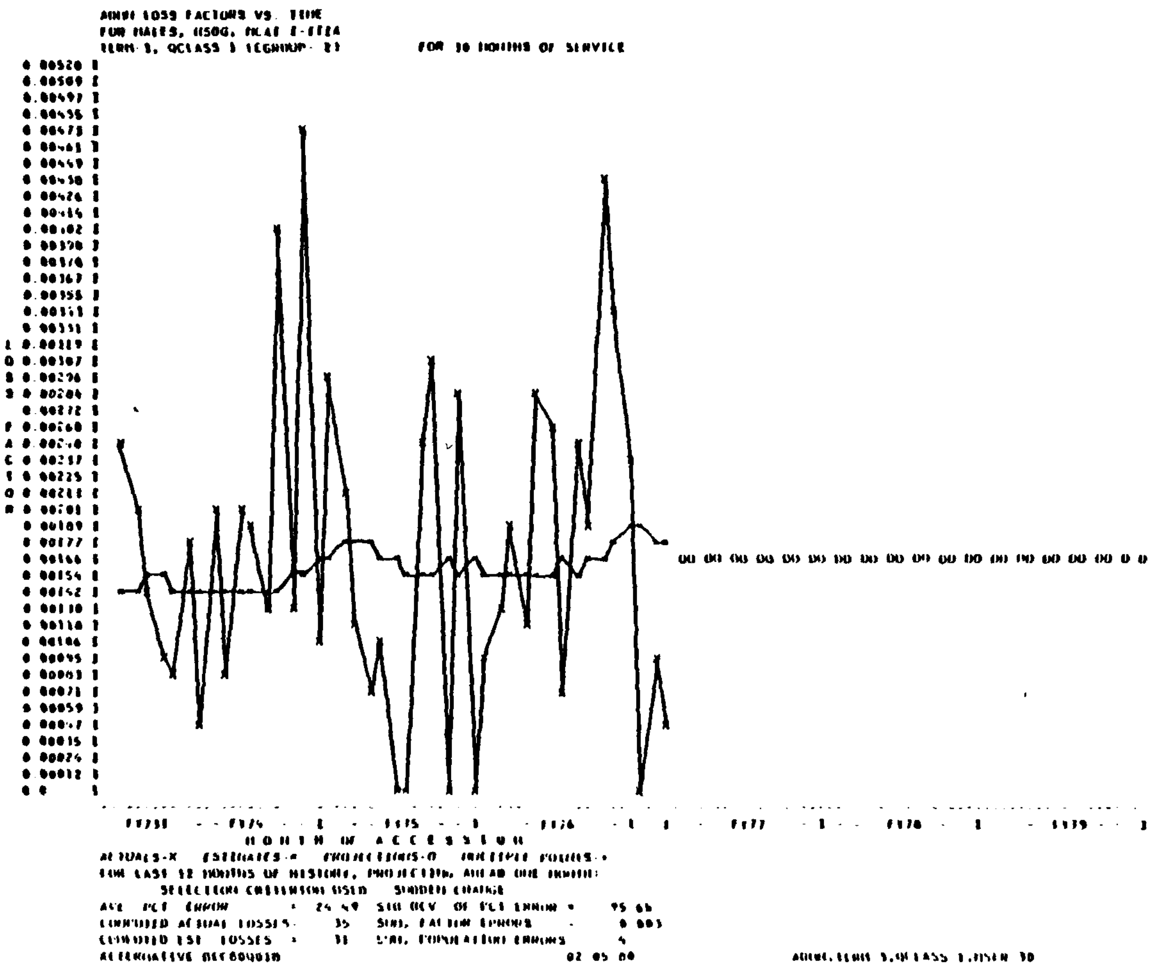


For most loss factors, the estimate of the factor for the first projection month is computed by a mathematical technique called exponential smoothing. This means that the estimated factor for the first projection month is a weighted average of the actual factors in past months, with the more recent months getting heavier weights. The factors estimated for the first projection month remain the same for subsequent months unless the user decides to change them. The system provides the user with a number of aids to identify trends in loss factors and to make projected factors follow desired trend lines. User controls over loss factors can be applied to specific types of losses and to specific categories of personnel.

Graphical displays are one of the most important aids for determining trends in loss factors. This slide shows one type of graphical display produced by the Rate/Factor Generator. The example shown is a loss-rate forecast derived by exponential smoothing. This particular rate is for administrative losses to male, high school diploma graduates, mental category I-IIIA, in the 30th month of a 3-year enlistment. The values of the loss rates are measured along the vertical scale. Time is measured along the horizontal scale. The points plotted as X's (connected by lines) represent historical (or actual) rates. The asterisks represent the results as exponential smoothing is applied iteratively, that is, adding one month's actual data at a time and forecasting one month ahead of the last actuals. The O's represent the forecasts for future months. As you can see there is no observable pattern to the actual rates plotted. In this case, exponential smoothing is an effective method of deriving a forecast.

EXAMPLE OF AN RFG FORECAST USING EXPONENTIAL SMOOTHING

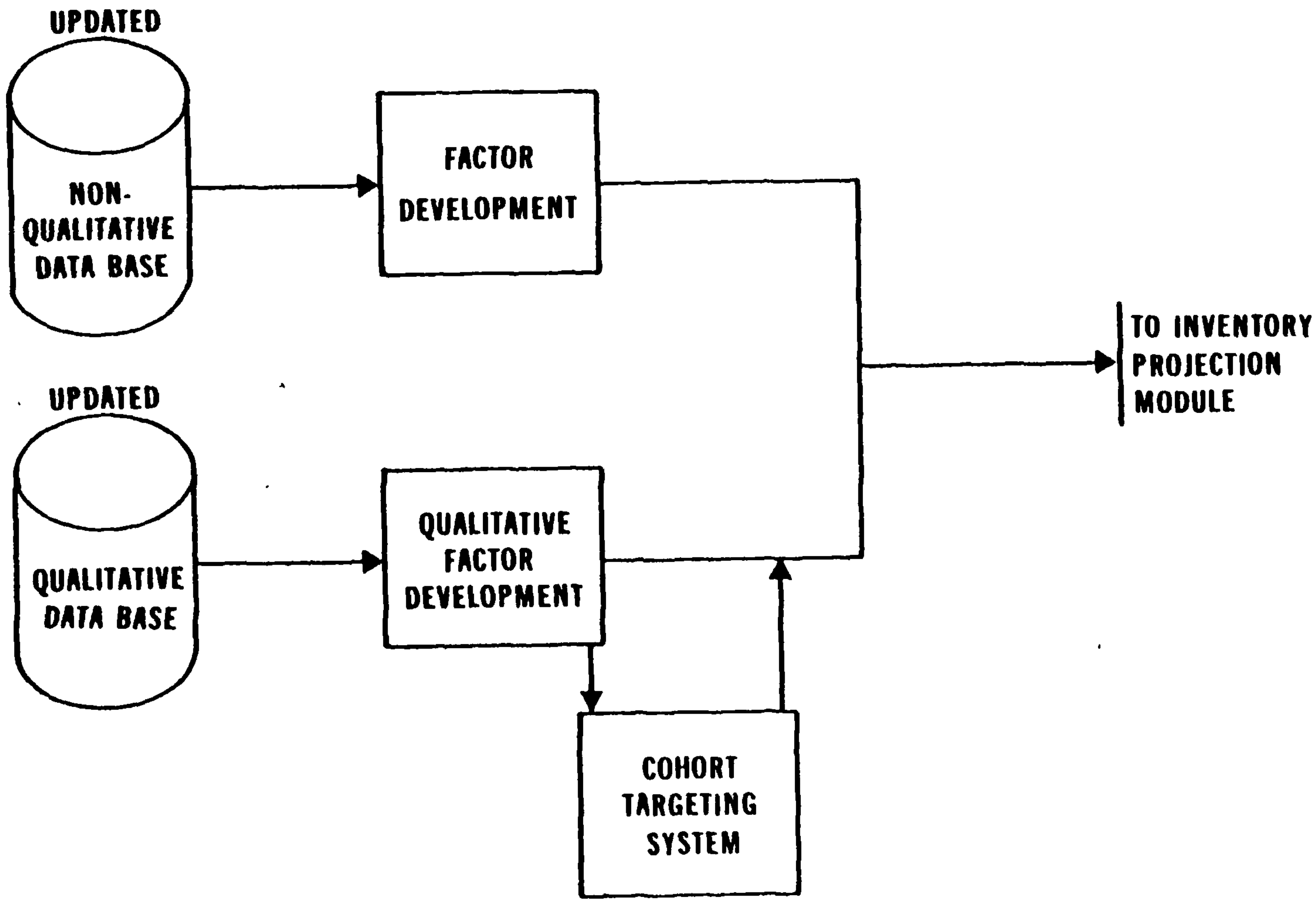
GRC



9

The Rate/Factor Generator has been designed to make it easy for the user to exercise control over rate forecasts whenever informed judgment provides a basis for doing so. Further, automated procedures have been provided for screening the time series for each rate to detect unanticipated sudden changes or incipient trends in the data and provide the user graphical displays for the affected rates. Even though the number of rates is large--currently 3500 population cells and 10 different loss categories--experience has demonstrated that this "management by exception" technique makes it feasible to manage the rate projections.

RATE/FACTOR GENERATOR

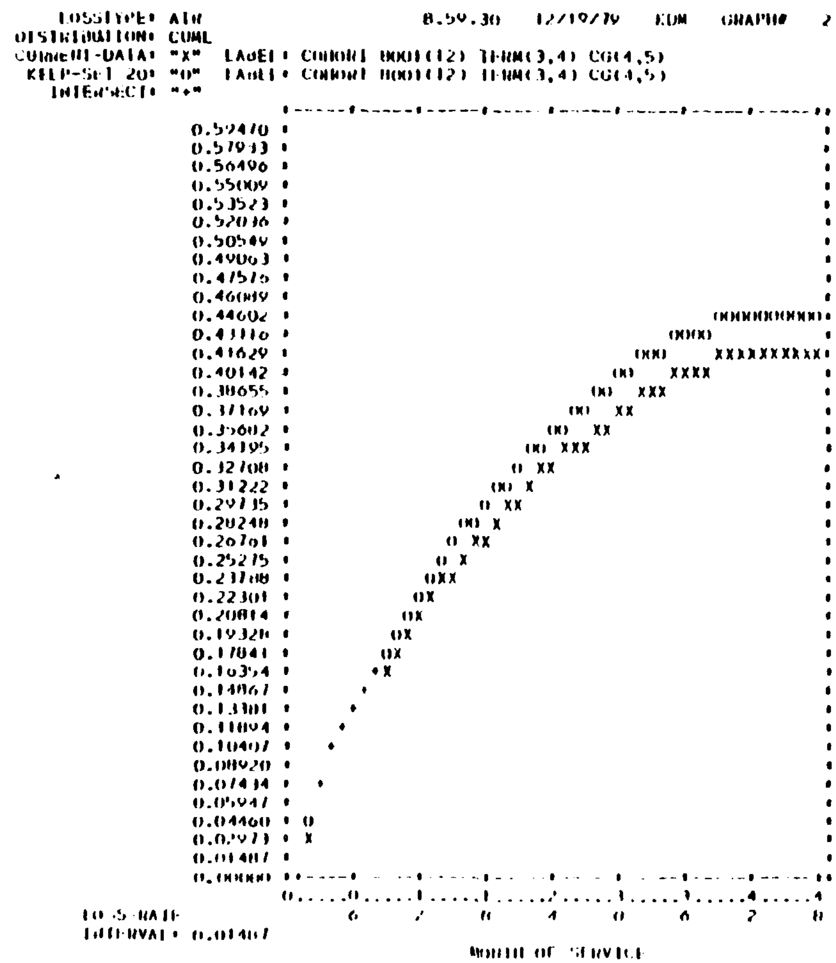


8

30

Another part of the Rate/Factor Generator Module, the Cohort Targeting System, provides the capability to organize loss data by accession cohort, thus permitting computation of cumulative losses for a specific month's accessions. A cohort includes all accessions during a given month separated into user-designated characteristic groups. These groups can be combined to form a larger cohort. The user can specify a variety of aggregations of loss categories, cohorts and characteristic groups.

EXAMPLE OF CTS MODIFICATION OF LOSS RATES



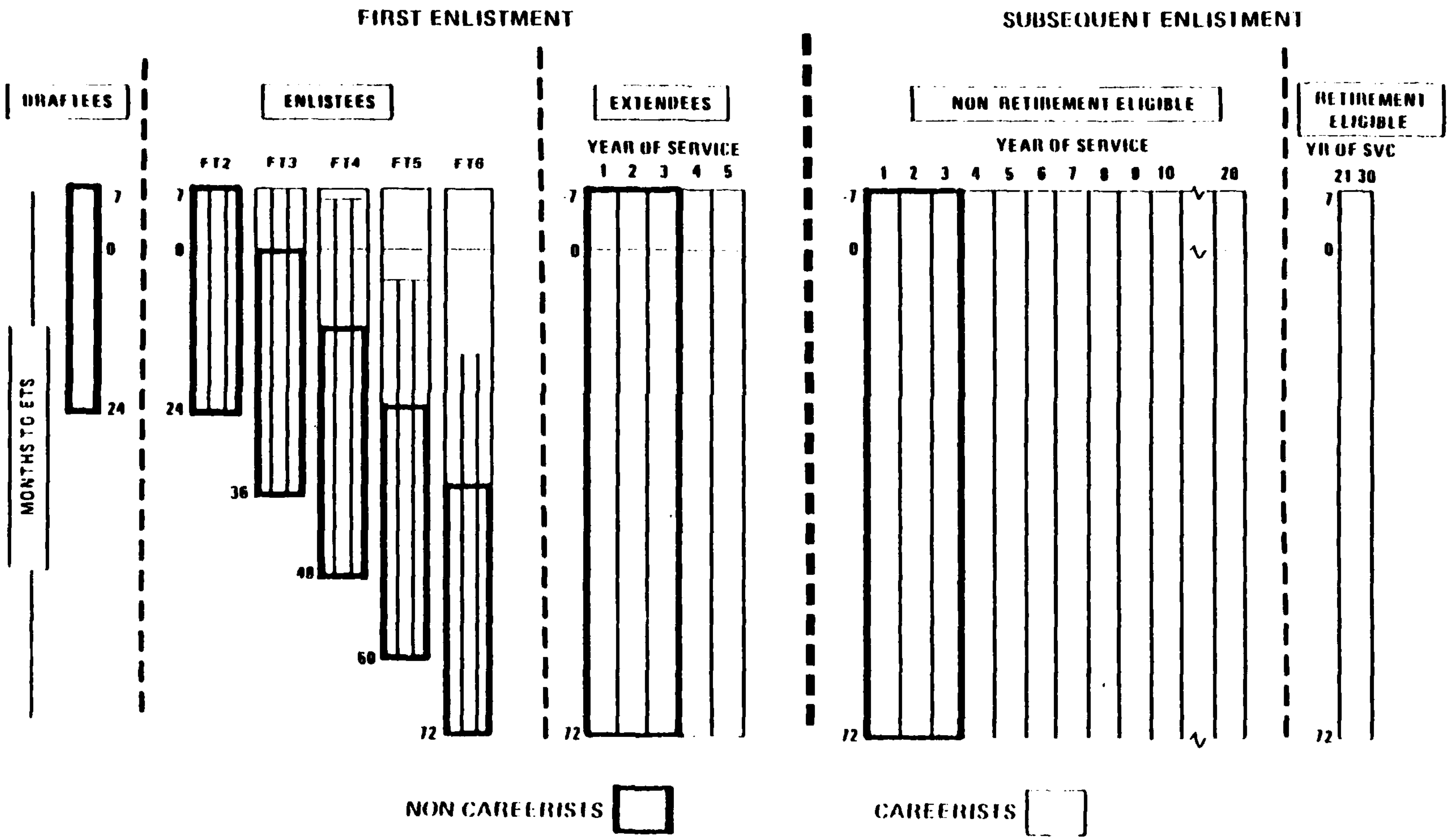
32

The user requests specific data, either historical or projected or a combination of both. The data may be displayed on-line or a printed chart prepared, as shown on this slide. The user may request, on-line, that the plotted rate be modified. If satisfied with the result, the user can direct the loss rates in the production system be modified accordingly.

In this example the cumulative loss rate, reflected by the "X's", includes all accessions during the 12 month period beginning January 1980 with 3 and 4 year terms of service. The population includes two characteristic groups identified as 4 and 5. The "O's" represent the modified loss rate.

For example, this chart shows the loss rate for attrition type losses for all accessions during the 12 month period beginning January 1980 with 3 and 4 year terms of service. The population includes two characteristic groups identified as 4 and 5. Attrition type losses include the Expeditious Discharge Program, Trainee Discharge Program, other adverse losses, physical disability, administrative, and losses for unknown reasons. The original cumulative loss rate forecast reflected by the "X's", was .416 or 41.6% of initial accessions. The "O's" reflect modification of the loss rate to 44.6%.

DATA ARRAY



34

The next module is the Inventory Projection Module (IPM). Its function is to project the inventory of enlisted personnel through time.

This slide once again is a visual representation of the population cells used for projection purposes. Not shown are lines dividing these cells by months to ETS. As stated before, the Rate/Factor Generator determines the loss factors for each cell. The Inventory Projection Module actually calculates the projected inventory. In the extendee and subsequent enlistment arrays, the Inventory Projection Module uses loss rates computed for each year of service, but actually breaks out the population by months of service (from 1 to 240 months), to ensure that the length of service distribution will be aged accurately for each month of projection.

INVENTORY PROJECTION

1. AGE INVENTORY FROM PREVIOUS MONTH
2. ADD GAINS
3. PROJECT REENLISTMENT GAINS AND EXTENSIONS
4. PROJECT EARLY RELEASE LOSSES
5. PROJECT LOSSES BY CATEGORY EXCEPT ETS
6. PROJECT ETS LOSSES

11

The logic of the projection process is summarized on this slide. Starting with the initial inventory supplied by the data processor, the inventory is projected through time in these steps:

1. Age the inventory from the previous month by advancing the cell designation of months to ETS and months of service by one month.

2. Add NPS and PS gains. The user may specify the number of each type of gain for some or all projection months or the user may let COMPLIPS's optimization process determine the number.

3. Project the number of gains from reenlistments and extensions from those eligible.

4. Project early release losses and subtract from the appropriate inventories. Early release policies are not currently in effect but when they were, the user specified the population eligible: for instance, those in short tour areas with DEROS within 3 months of ETS.

5. Project losses by all loss categories except ETS and subtract from the appropriate cell. Loss rates supplied by the RFG vary by projection month and cell. These rates are applied to the strength remaining in each corresponding cell following the preceding computations.

INVENTORY PROJECTION

1. AGE INVENTORY FROM PREVIOUS MONTH
2. ADD GAINS
3. PROJECT REENLISTMENT GAINS AND EXTENSIONS
4. PROJECT EARLY RELEASE LOSSES
5. PROJECT LOSSES BY CATEGORY EXCEPT ETS
6. PROJECT ETS LOSSES

11

6. Project ETS losses and subtract from each eligible cell. ETS loss rates are supplied for each population cell representing persons from one month prior to ETS to more than 6 months after ETS.

Two files result from the Inventory Projection Module processing: a strength, gain, and loss file for use by the COMPLIP Module; and a loss and retention rate file used by the Report Generator.

One further point about the projection logic should be mentioned. When COMPLIP determines the number of NPS gains, this number is not known at the time the IPM is run. The system handles this problem as follows. For any month where COMPLIP will determine the NPS gains, the IPM sets the NPS gains to the arbitrary number 1000. The IPM computations then determine the fraction of these 1000 people who remain in the Army in each subsequent month. Then, after COMPLIP has determined a realistic number of NPS gains, the Report Generator Module combines the results of the IPM and COMPLIP, making the final projection of strength, gains, and losses.

The user can also request printouts of the results of specific IPM intermediate computations. Such printouts may be useful in performing detailed analysis to determine effects of proposed policy changes. ELIM-COMPLIP in this way adds a degree of confidence in predicting the impact of changes in Army personnel policy.

EXPLANATORY VARIABLES AND FACTORS USED IN NPS GAINS MODULE

GRC

ECONOMETRIC VARIABLES

- UNEMPLOYMENT RATES
- MILITARY TO CIVILIAN PAY RATIO
- POPULATION OF PRIME RECRUITING AGE

POLICY VARIABLES

- NUMBER TO BE RECRUITED
- NUMBER OF COMBAT-ARMS OPTIONS
- PERCENT OF MENTAL CATEGORY IV PERMITTED
- AVAILABILITY OF 2-YEAR ENLISTMENT OPTIONS
- NUMBER OF ARMY RECRUITERS
- NUMBER OF RECRUITING AIDES
- ADVERTISING EFFORT

SEASONAL FACTORS

12

Availability of NPS enlistees may be forecast using the Non-Prior Service Gains Module. This module uses the same historical data base as the Oualitative Factor Development Module--the Tracking File--and the statistical technique of non-linear step wise regression. The model assumes that the availabilty of NPS gains is closely related to a number of explanatory variables and seasonal factors.

The explanatory variables currently in use are identified on this slide. They fall into two groups: econometric variables, which are beyond Army control, and policy variables, which are Army influenced. The user chooses the variables to be used and supplies monthly values for past periods and monthly projected values for future periods.

The seasonal factors reflect the seasonal enlistment patterns of the population. The model computes these seasonality factors.

During the process of solution, the model determines which of the user supplied variables are actually useful in explaining the variations in historical data for each sub-population. User supplied variables which do not assist in explaining the variations are rejected during the computations. The results state which were retained as useful in arriving at a solution.

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MODIFICATIONS TO ELIM-COMPLIP AND MOSLS FOR MOBILIZATION STRENG--ETC(U)
MAY 82 K D MIDLAM, W E BARTLETT, E BERGE MDA903-81-C-0649

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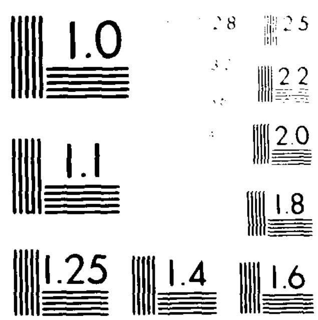

1.0
2.8
2.5
2.2
2.0
1.1
1.8
1.25
1.4
1.6

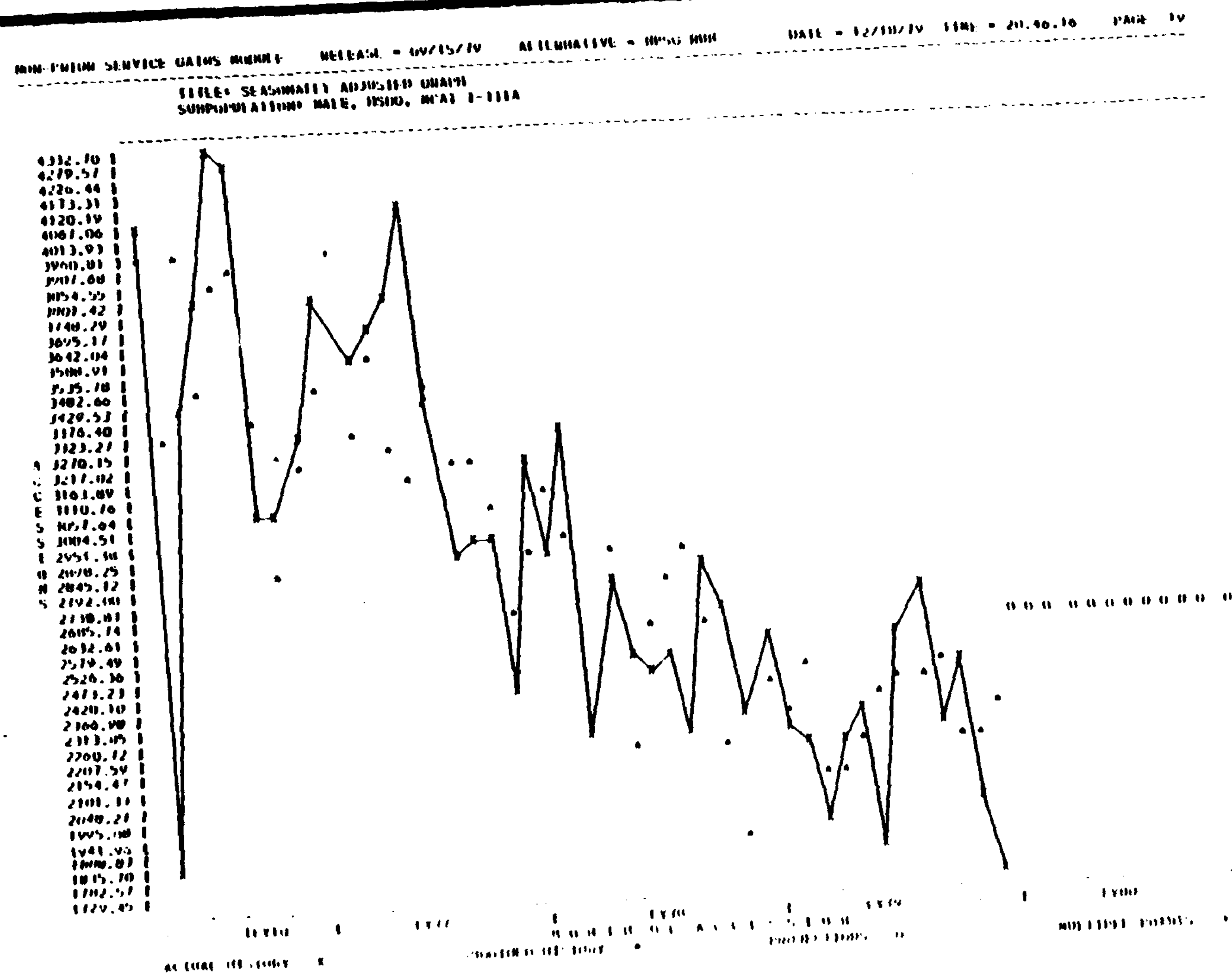
DIVISION OF DEMOGRAPHIC CHARACTERISTICS USED BY THE NPS GAINS MODULE

CHARACTERISTIC	DIVISION
SEX	MALE, FEMALE
RACE	BLACK, NON-BLACK
MENTAL CATEGORY	I TO IIIA, IIIB, IV
BONUS	BONUS, NON-BONUS
TERM OF SERVICE	2, 3, 4, 5-6 YEAR TERMS
CIVILIAN EDUCATION	HIGH SCHOOL DIPLOMA GRADUATES
	NON-HIGH SCHOOL GRADUATES
AGE AT ACCESSION	UNDER 18, 18 and 19, 20 AND 21 22 AND OVER

13

The NPS gains module forecasts not only the total number of NPS enlistees, but also the numbers of enlistees having certain demographic characteristics. The characteristics involved are shown on this slide. The user may specify the desired grouping of characteristics.

NPS GAINS GRAPH, SEASONALLY ADJUSTED



The NPS gains module produces graphs as well as tables to show the projection of future enlistments and the historical data. This slide shows the deseasonalized graph for HSDG, Mental Category I-IIIA. Similar graphs are produced for each selected characteristic group showing both seasonal and deseasonalized patterns.

The principle use of the NPS Gains Module is to estimate the availability of various categories of NPS enlistees for input to ELIM-COMPLIP. However, this module also has the capability to estimate the effect ~~on~~ enlistments of changes in the explanatory variables.

INPUTS TO COMPLIP COMPUTATIONS

INPUT	SOURCE
MONTHLY TRAINED STRENGTH TARGETS	FORCE STRUCTURE ALLOWANCE
CURRENT ACTUAL STRENGTH	IPM
PROJECTED PERSONNEL LOSSES	IPM
LOSS RATES FOR PROJECTED ACCESSIONS	IPM
PROJECTED AVAILABILITY OF ACCESSIONS	NPS GAINS MODULE OR A PRIOR RUN
RATES USED TO PROJECT TTHS STRENGTH	EXTERNAL INPUT TO ELIM-COMPLIP

15

The COMPLIP Module is the heart of the system. COMPLIP uses linear programming to generate an optimal manpower program, if it is feasible to do so. The user may tailor the criteria for optimality to his needs while at the same time specifying constraints on the solution. This slide shows some of the principle inputs to the COMPLIP module, and the source of each. As mentioned at the start of this briefing, the monthly trained strength targets are a primary input.

The starting point for strength computations is the current actual strength of the Army. Other givens, or inputs are:

- Projected personnel losses
- Loss rates for projected accessions
- Projected availability of accessions
- Rates used to project Trainee, Transient, Holdee and Student (TTHS) strength

Note that the Inventory Projection Module is shown as the source for actual strength, projected losses, and projected loss rates. In a sense the actual strength comes from the Data Processor Module, and the projected loss rates come from the Rate/Factor Generator; but it is the Inventory Projection Module which brings all of this information together and assembles it into a form in which it can be used by COMPLIP.

CONSTRAINTS

PERSONNEL COSTS

LIMITS ON STRENGTH AND MANYEARS

LIMITS ON GAINS BY C-GROUP

LIMITS ON PRIOR SERVICE GAINS AND IMMEDIATE REENLISTMENTS

TRAINING BASE CAPACITY

In addition to these standard inputs, there are a number of constraints which the user may impose when running COMPLIP. These are summarized on this slide.

- There may be maximum and/or minimum costs or a fixed value in any FY for personnel costs, including officer manyears, enlisted manyears, reenlistments and PCS costs.

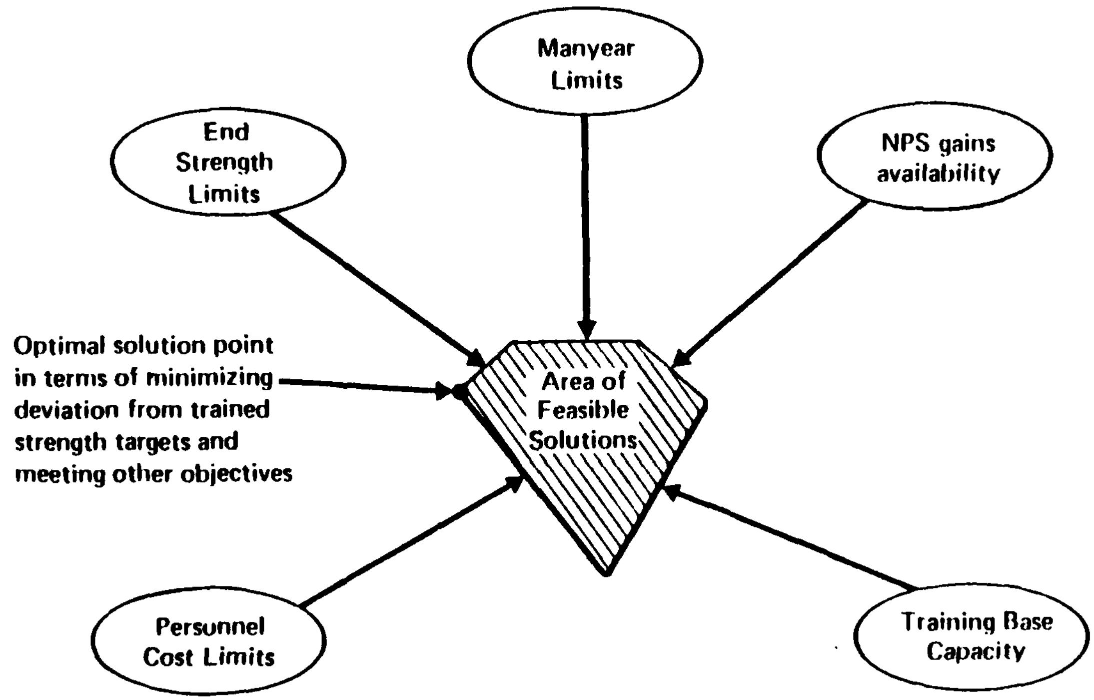
- There may be upper or lower limits on total strength and manyears at the end of any FY. These limitations usually reflect Congressional or budget constraints.

- The user may choose to limit NPS gains by characteristic group seasonally or by annual total. He may also limit NPS gains by one characteristic group or set of groups to be a proportion of another group or set of groups.

- When in the Career Force Optimization Mode the user may specify the upper and lower bounds of prior service gains and immediate reenlistments by projection month and year of service.

- The training base capacity may be limited in terms of the number of companies per week which can begin basic training.

SOLUTION TO LINEAR PROGRAM



The next slide illustrates the concepts of feasible and optimal solutions to the COMPLIP linear programming problem. The constraints, or user options, that we have just discussed establish limits on the solution developed by the linear program. A solution that meets all of these constraints is said to be a feasible solution. The more constraints imposed and the tighter the constraints are set, the smaller the area of feasible solution. Imposition of conflicting constraints--for example, a requirement to achieve a specified end strength and a limit on NPS enlistments which does not allow enough gains to achieve this end strength, would result in a situation where a feasible solution is not possible. Assuming that the constraints imposed allow feasible solutions, the objective functions are the criteria which the user specifies to obtain the "best" solution within the constraints specified. This solution is called the optimal solution.

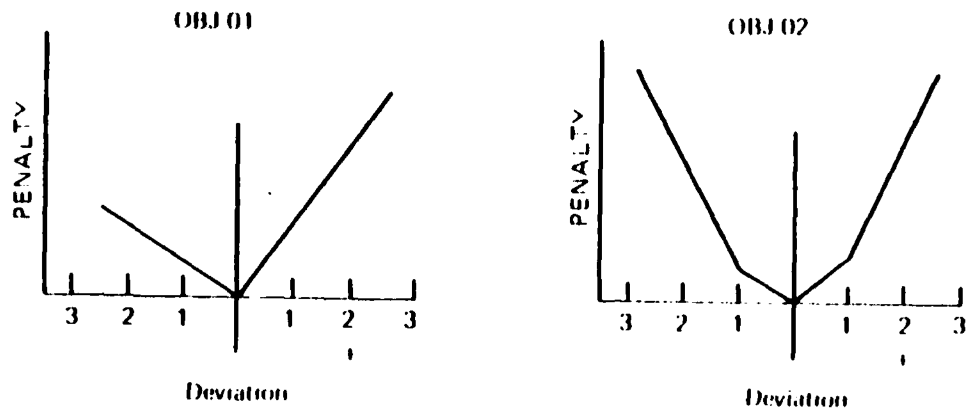
OBJECTIVE FUNCTIONS

GRC

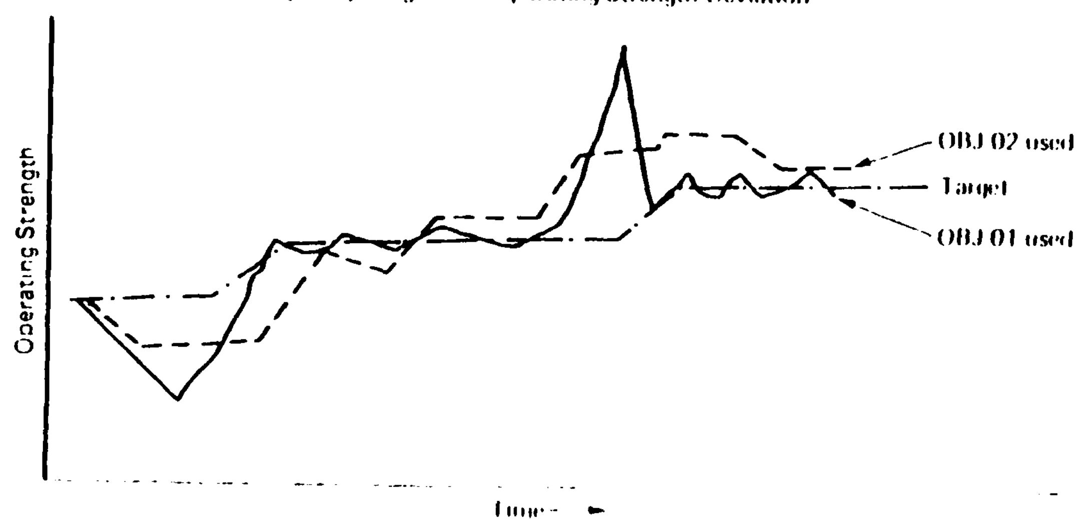
1. MINIMIZE DEVIATIONS OF OPERATING STRENGTH FROM TARGET BY WEIGHTING THE SUM OF ABSOLUTE VALUES
2. MINIMIZE DEVIATIONS OF OPERATING STRENGTH FROM TARGET BY WEIGHTING THE SUM OF TWO SETS OF ABSOLUTE VALUES
3. MINIMIZE THE REP TRAINING BACKLOG
4. MINIMIZE/MAXIMIZE FIRST TERM ENLISTMENTS BY CHARACTERISTIC GROUP
5. MINIMIZE DEVIATIONS OF TOTAL STRENGTH FROM TARGET STRENGTH
6. MINIMIZE DEVIATIONS OF TOTAL MANYEARS FROM TARGET MANYEARS
7. MINIMIZE DEVIATIONS OF ENLISTED MANYEARS BY YOS FROM OBJECTIVE FORCE
8. MINIMIZE DEVIATIONS FROM THE OBJECTIVE FORCE BY INFLUENCING IMMEDIATE REENLISTMENTS AND PS GAINS

The next slide shows the objective functions available. The first solution to the linear program has always minimized deviations of operating strength from the target strength by weighting the sum of the absolute values of deviations. The weights reflect the relative penalties for deviations in different periods and in different directions, that is, whether overstrength or understrength. As a further option, the user may specify greater penalties for deviations that exceed a specific limit.

COMPARISON OF OBJECTIVE FUNCTIONS



Penalty weights for Operating Strength Deviation



	OBJ 01	OBJ 02
Sum of deviations	98	104
Maximum deviation	16	8

This slide illustrates the difference between two objective functions. In the first objective function, the penalty is directly proportional to the deviation, and in this case there is a slightly higher penalty for overstrengths then for understrengths, as indicated by the steeper line on the right side of the small graph on the upper left. In the second objective function, the penalty is the same for overstrengths and understrengths, but the penalty for deviations of more than 1000 men in any month is high, as indicated by the steeper lines on the small graph on the upper right. The larger graph on the bottom shows the target strength, and two operating strength projections. Using objective 1, the total deviation is minimized, but there are a few very large deviations. Using the second objective function, the total deviation is slightly larger, but the maximum deviation is considerably less. The selection between these two objective functions reflects user value judgements concerning the relative importance of deviations of different magnitudes.

OBJECTIVE FUNCTIONS

GRC

1. MINIMIZE DEVIATIONS OF OPERATING STRENGTH FROM TARGET BY WEIGHTING THE SUM OF ABSOLUTE VALUES
2. MINIMIZE DEVIATIONS OF OPERATING STRENGTH FROM TARGET BY WEIGHTING THE SUM OF TWO SETS OF ABSOLUTE VALUES
3. MINIMIZE THE REP TRAINING BACKLOG
4. MINIMIZE/MAXIMIZE FIRST TERM ENLISTMENTS BY CHARACTERISTIC GROUP
5. MINIMIZE DEVIATIONS OF TOTAL STRENGTH FROM TARGET STRENGTH
6. MINIMIZE DEVIATIONS OF TOTAL MANYEARS FROM TARGET MANYEARS
7. MINIMIZE DEVIATIONS OF ENLISTED MANYEARS BY YOS FROM OBJECTIVE FORCE
8. MINIMIZE DEVIATIONS FROM THE OBJECTIVE FORCE BY INFLUENCING IMMEDIATE REENLISTMENTS AND PS GAINS

Subsequent to the solution with the primary objective function, a solution using one or more additional objective functions may be used. They are to:

- Minimize the monthly backlog of Reserve Enlisted Personnel awaiting entry on active duty for training. This solution is subject to total training capacity and that already allocated to the Active Army. Currently this objective function is not used since the REP Active Duty for Training input is a fixed user number.

- Minimize the number of first term enlistments in user specified characteristic groups. The weights given can be either positive to minimize corresponding enlistments or negative to maximize corresponding enlistments. This objective may be used by characteristic group so as, for example, to maximize high school graduate enlistments and minimize enlistment of non-high-school graduates.

- Minimize the deviation of total strength from target strength at the end of specified FY's. This might be used to produce a program that closely approximates endstrengths authorized by OSD or the Congress.

- Minimize the deviation of total manyears from target manyears. This function might be used to minimize manyear costs, or to generate a program that most closely approximates Congressionally authorized manyears or average strength.

OBJECTIVE FUNCTIONS

1. MINIMIZE DEVIATIONS OF OPERATING STRENGTH FROM TARGET BY WEIGHTING THE SUM OF ABSOLUTE VALUES
2. MINIMIZE DEVIATIONS OF OPERATING STRENGTH FROM TARGET BY WEIGHTING THE SUM OF TWO SETS OF ABSOLUTE VALUES
3. MINIMIZE THE REP TRAINING BACKLOG
4. MINIMIZE/MAXIMIZE FIRST TERM ENLISTMENTS BY CHARACTERISTIC GROUP
5. MINIMIZE DEVIATIONS OF TOTAL STRENGTH FROM TARGET STRENGTH
6. MINIMIZE DEVIATIONS OF TOTAL MANYEARS FROM TARGET MANYEARS
7. MINIMIZE DEVIATIONS OF ENLISTED MANYEARS BY YOS FROM OBJECTIVE FORCE
8. MINIMIZE DEVIATIONS FROM THE OBJECTIVE FORCE BY INFLUENCING IMMEDIATE REENLISTMENTS AND PS GAINS

Two other objective functions available were designed expressly to optimize the enlisted career force by year-of-service targets. They are to:

- Minimize the deviations of enlisted manyears of each year-of-service group from specified targets. This is accomplished by controlling the numbers of immediate reenlistments and prior-service gains. The results project deviations from a given "objective force."
- Minimize the deviations from the objective force by influencing immediate reenlisments and PS gains. Additional options allow the user to specify whether more emphasis is to be placed on controlling immediate reenlistments or on controlling prior service gains.

More than one objective function may be used with each run of the COMPLIP Module. The user specifies the sequence of the objective functions and each solution sets constraints for subsequent runs to preserve the results of each step. Thus each new objective function effectively provides improvements on the solution.

AAMMP
ACTIVE ARMY MILITARY MANPOWER PROGRAM

The last module to be discussed is the Report Generator Module.

It produces the reports which comprise the Active Army Military Manpower Program (AAMMP) and miscellaneous data files used to produce graphs and other reports.

The report generator combines the detail prepared by the Inventory Projection Module, the gains data, and the results of the final acceptable linear program projection produced by COMPLIP. A considerable amount of computation is performed and the rather voluminous AAMMP prepared.

To illustrate AAMMP ouputs, I will use the March 1980 update. I shall briefly describe the first five charts shown on this slide. The remaining charts provide much more detail. (Extracts of AAMMP may be distributed here.)

The information appearing on the report cover is prepared by the system operator. It is arranged to show the options, program objectives and endstrengths used as a basis for computation along with any other explanatory notes deemed appropriate.

CHART A: PROGRAM SUMMARY

GRC

LAST MONTH OF HISTORICAL DATA IS JAN 1980

DATE: 80.075
TIME: 12.20.11

CHART A: PROGRAM SUMMARY
(SCALED IN THOUSANDS)

- TEIN IV -
ALTERNATIVE 02701
12 MAR 1980

	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85	FY 86
STRENGTH							
ES	774.8	775.0	781.0	781.9	781.2	782.8	782.0
MY	765.9	769.1	776.5	777.2	777.6	780.4	780.1
ESA(ENDYEAR)*							
ESA MY*							
OPR STR MY	659.5	671.5	677.8	677.1	681.1	680.6	677.7
OPR STR DEV ES*							
OPR STR DEV MY*							
TTHS ES	50.7	49.4	50.6	50.7	50.3	50.2	50.2
TTHS MY	47.5	47.9	49.1	49.8	49.1	49.9	49.8
TRAINEE ES	64.0	61.2	61.4	61.1	57.8	60.5	61.0
TRAINEE MY	56.9	49.7	49.4	51.8	47.2	50.9	52.1
CAR MY	321.9	321.7	322.6	327.7	330.5	331.6	331.9
RECRUITING							
NPS MALE	133.0	112.2	111.4	120.3	110.2	113.0	110.3
NPS HSDG MALE	78.0	82.9	87.9	81.0	80.0	78.0	78.0
NPS FEMALE	22.7	22.8	24.8	26.4	26.1	26.0	24.5
PS	14.0	14.0	14.0	14.0	14.0	14.0	14.0
REENL							
TOTAL RE	82.8	77.8	85.1	86.9	83.7	88.4	88.6
FT	24.1	20.1	24.4	22.3	20.5	21.1	20.9
CAR	58.5	57.7	60.7	64.7	63.1	67.3	67.7
LOSSES (TOTALS INCLUDE MIS)							
ADVERSE LOSS	35.9	36.2	34.7	34.2	33.6	33.3	33.4
FT	30.8	31.1	29.9	29.2	28.7	28.6	28.5
CAR	5.1	5.0	4.8	5.0	4.9	4.8	4.9
ATTRITION LOSS	65.4	64.3	63.3	63.8	63.1	63.0	63.1
FT	48.6	48.5	47.8	47.8	47.4	47.4	47.4
CAR	16.8	15.8	15.4	15.9	15.7	15.6	15.7
ETS LOSS	82.2	72.6	74.4	87.3	81.0	83.4	86.9
FT	40.3	31.4	35.1	42.8	37.1	37.1	39.3
CAR	41.9	41.2	39.2	44.6	43.9	46.3	47.6
TRAINING							
IET GRADUATES	97.5	74.9	95.7	102.4	96.1	91.6	101.1

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*These data have been deleted in order to avoid marking this document "FOR OFFICIAL USE ONLY."

Key manpower program summary data for each FY of the AAMMP are displayed on Chart A. This includes strength, recruiting, immediate reenlistments, losses, and training. Data on this chart are shown in greater detail on subsequent charts.

All strength, gain and loss data are scaled in thousands in each chart. On most charts, data are listed to one decimal place thereby giving the number to the nearest 100 persons. A few charts list data to three decimal places or to the nearest person.

(Explain abbreviations used if the audience may not be knowledgeable.)

Abbreviations used in Chart A

ES - End Strength (end of fiscal year)

MY - Manyears (average strength throughout year)

FSA - Force Structure Allowance (operating strength targets)

OPR STR - Operating Strength (actual)

THS - Transients, Holdees, and Students

CAR - Careerists (personnel with more than 36 months of service)

NPS - No Prior Service

HSDG - Hght School Diploma Graduate

FT - First Termers (personnel with fewer than 37 months of service)

IET UTIL - Initial Entry Training, Utilization of Capacity

CHART B: PROGRAM COMPARISON

GRC

LAST MONTH OF HISTORICAL DATA IS JAN 1980

FORMAT: CURRENT - PRIOR = DELTA   CHART B: PROGRAM COMPARISON   (SCALED IN THOUSANDS)   FLOW IV

CURRENT - REQ: REBUDGET MAR UPDATE JAN DATA   ALT: D7703   DATE: 80 075   TIME: 12 20 13
PRIOR   REQ: MAR UPDATE JAN DATA   ALT: D9702   DATE: 80 071   TIME: 21.41.52

	FY 80 C	FY 80 P =	FY 80 D	FY 81 C	FY 81 P =	FY 81 D	FY 82 C	FY 82 P =	FY 82 D	FY 83 C	FY 83 P =	FY 83 D	FY 84 C	FY 84 P =	FY 84 D	FY 85 C	FY 85 P =	FY 85 D	FY 86 C	FY 86 P =	FY 86 D
STRENGTH																					
ES	774	774	0.0	776	776	0.0	781	781	0.0	784	784	0.0	783	783	0.0	783	783	0.0	783	783	0.0
MY	766	766	0.3	769	769	0.0	776	776	0.0	779	779	0.1	780	780	0.0	780	780	0.0	780	780	0.0
ESALTDYEAR*																					
ENA MY*																					
OPR STR MY	659	660	0.0	672	672	0.2	678	678	0.0	677	677	0.0	681	681	0.0	681	681	0.0	679	679	0.0
OPR STR DEV ES*																					
OPR STR DEV MY*																					
TMS ES	51	51	-0.1	49	49	0.0	51	51	0.0	51	51	0.0	50	50	0.0	50	50	0.0	50	50	0.0
TMS MY	49	50	-0.0	48	48	0.0	49	49	0.0	49	49	0.0	49	49	0.0	49	49	0.0	49	49	0.0
TRAINEE ES	64	64	0.5	61	61	-0.0	62	61	0.0	61	61	0.0	60	60	0.0	60	61	0.0	61	61	0.0
TRAINEE MY	57	57	-0.2	50	50	0.2	49	49	-0.0	55	55	0.1	49	49	0.0	51	51	0.0	57	57	0.0
CAR MY	322	322	0.0	322	322	0.0	323	323	-0.0	320	320	0.0	330	330	0.1	332	332	0.0	332	332	-0.0
RECRUITING																					
NPS MALE	133	133	0.1	112	112	0.0	111	111	-0.0	120	120	-0.0	110	110	0.0	115	115	0.0	110	110	0.0
NPS HSDG MALE	70	70	0.0	82	82	0.0	82	82	-0.0	81	81	0.0	80	80	0.0	78	78	0.0	78	78	0.0
NPS FEMALE	23	23	-0.0	21	21	0.0	25	25	-0.0	26	26	0.0	26	26	0.0	26	26	0.0	25	25	0.0
PS	14	14	-0.0	14	14	0.0	14	14	0.0	14	14	0.0	14	14	0.0	14	14	0.0	14	14	0.0
JOB REEN																					
TOTAL IR	83	83	0.0	78	78	0.0	85	85	0.1	87	87	-0.1	84	84	0.0	88	88	-0.0	89	89	-0.0
FT	24	24	0.0	20	20	0.0	24	24	0.0	22	22	0.0	21	21	0.0	21	21	0.0	21	21	0.0
CAR	58	57	-0.0	58	58	0.0	61	61	0.0	65	65	0.0	63	63	0.0	67	67	-0.0	68	68	-0.0
LOSSES (EXCL ANS)																					
ADVERSE LOSS	36	36	-0.0	36	36	-0.0	35	35	0.0	34	34	0.0	34	34	0.0	33	33	0.0	33	33	0.0
FT	31	31	0.1	31	31	0.0	30	30	0.0	29	29	0.0	29	29	0.0	29	29	0.0	29	29	0.0
CAR	5	5	0.0	5	5	0.0	5	5	0.0	5	5	0.0	5	5	0.0	5	5	0.0	5	5	-0.0
ATTRITION LOSS	65	66	-0.1	66	66	0.0	63	63	0.1	64	64	0.0	63	63	0.0	63	63	0.0	63	63	0.0
FT	47	49	0.1	49	49	0.0	48	48	0.0	48	48	0.0	47	47	0.0	47	47	0.0	47	47	0.0
CAR	17	17	-0.0	16	16	0.0	15	15	0.0	16	16	0.0	16	16	0.0	16	16	0.0	16	16	0.0
ETS LOSS	82	82	0.0	73	73	0.0	74	74	0.0	87	87	0.1	81	81	0.0	83	83	0.0	87	87	0.0
FT	40	40	-0.0	31	31	0.0	35	35	0.0	43	43	0.0	37	37	0.0	37	37	0.0	39	39	0.0
CAR	42	42	0.0	41	41	0.0	39	39	0.0	45	45	0.0	44	44	0.0	46	46	0.0	48	48	-0.0
TRAINING																					
IET UTILIZED	99	98	0.1	97	97	0.1	96	96	0.0	102	102	0.0	96	96	0.0	100	100	0.0	101	101	0.0

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The entries listed in Chart B are the same as those in Chart A. This display, however, lists two manpower programs designated "C" for current, and "P" for the prior program, and the difference or delta under "D". The heading identifies the requirement prompting the manpower program being run. In this example the current requirement is rerun March update using January data and the prior requirement to which it is compared is the initial March update using January data. The "D" column shows the actual change in the programs being compared. Several comparative charts can be prepared in one run.

CHART C:
MANPOWER COST DATA

GRC

LAST MONTH OF HISTORICAL DATA IS JAN FY80

DATE: 80.075
TIME: 12.20.13
REQ: REPUBL MAR UPDATE--JAN DATA

CHART C
MANPOWER COST DATA
(SCALED IN MILLIONS)

FLIN IV
ALTERNATIVE 09703

COST CATEGORIES	FY 80	FY 81	FY 82	FY 83	FY 84	FY 85	FY 86
TOTAL COST	11336.60	11780.94	11960.74	11857.61	12151.65	12240.37	12237.07
MANYEARS COSTS							
TOTAL	9843.03	10107.35	10244.11	10286.74	10353.24	10392.76	10306.05
OFF	2400.58	2469.37	2462.84	2462.07	2427.00	2512.70	2517.00
ENL RA	7094.57	7323.00	7473.78	7496.31	7550.38	7563.68	7546.34
ENL TRAINEE	325.34	287.46	285.72	306.77	294.31	294.54	301.15
CADET	22.54	22.57	21.57	21.57	21.58	21.57	21.57
OTHER PAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GAINS COSTS							
TOTAL	120.41	122.31	127.70	133.97	126.04	131.37	133.74
OFF	2.28	2.46	2.20	2.30	2.20	2.17	2.17
TOTAL NPS	71.07	63.06	63.56	68.33	63.63	64.84	66.57
NPS	70.50	62.40	62.91	67.68	62.98	64.19	65.92
NPAS	0.58	0.65	0.65	0.65	0.65	0.65	0.65
TOTAL REN	47.05	56.79	62.06	63.34	61.01	64.37	64.47
UNDER REN	47.05	56.79	62.06	63.34	61.01	64.37	64.47
IPG	45.97	55.36	60.67	61.91	59.57	62.94	63.06
REN 2 90	1.09	1.44	1.44	1.44	1.44	1.44	1.44
TOTAL PS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
REN GR90	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER PS	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CADET	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOSSES COSTS							
TOTAL	101.51	97.57	96.94	103.21	99.94	101.31	102.91
OFF	27.44	28.63	27.06	28.02	28.18	28.56	28.56
ENL RA	74.06	68.79	67.88	75.17	71.76	72.74	74.35
CADET	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCS COSTS	663.57	762.94	776.83	637.72	875.84	919.34	919.33
SPEC INCENTIVE PAY COSTS	282.61	310.23	310.23	310.23	310.23	310.23	310.23
ALLOW + SEP	330.54	305.55	305.55	305.55	305.55	305.55	305.55
OTHER COSTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Manpower Cost data are listed in this chart for each fiscal year of the current manpower program. It shows total dollar cost projections broken out by major personnel category as well as costs for gains, losses, PCS costs, special incentive pay costs, and other costs as defined. Costs are stated in millions of dollars. Costs computations are based on user-provided cost factors.

CHART D:
COST COMPARISON

GRC

FLIM IV -

FORMAT: CURRENT PRIOR = DELTA   CHART D: COST COMPARISON (SCALED IN MILLIONS)

CURRENT - REQ: REMAN MAR UPDATE JAN DATA   ALT: D2703   DATE: 80.075   TIME: 12.20.13
PRIOR - REQ: MAR UPDATE JAN DATA   ALT: D2702   DATE: 80.071   TIME: 21.43.32

COST CATEGORIES	FY 80 CURRENT	FY 80 PRIOR	FY 80 DELTA	FY 81 CURRENT	FY 81 PRIOR	FY 81 DELTA	FY 82 CURRENT	FY 82 PRIOR	FY 82 DELTA	FY 83 CURRENT	FY 83 PRIOR	FY 83 DELTA
TOTAL COST	11336.68	11339.65	2.97	11780.94	11782.06	1.12	11960.74	11960.71	0.03	11857.61	11857.07	0.54
MANYEARS COSTS												
TOTAL	9843.03	9845.04	-2.01	10102.35	10103.54	1.19	10244.11	10244.11	0.0	10286.74	10286.09	0.65
OFF	2400.58	2400.58	0.00	2469.37	2469.37	0.00	2462.84	2462.84	0.00	2462.09	2462.09	0.00
ENL RA	7094.57	7095.48	-0.91	7323.00	7325.23	2.23	7473.98	7474.02	-0.04	7496.31	7495.59	0.72
ENL TRAINEE	325.34	326.45	-1.11	287.46	286.41	1.05	285.72	285.69	0.03	306.77	306.85	-0.08
CADET	22.54	22.54	-0.00	22.52	22.52	0.00	21.57	21.57	-0.00	21.57	21.57	-0.00
OTHER PAY	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GAINS COSTS												
TOTAL	120.41	120.47	0.06	122.31	122.30	0.01	127.90	127.90	0.00	133.97	134.00	-0.03
OFF	2.28	2.30	0.02	2.46	2.46	0.00	2.28	2.28	0.00	2.30	2.30	0.00
TOTAL NPS	71.07	71.12	-0.05	63.06	63.04	0.02	63.56	63.55	0.01	68.33	68.35	-0.02
NPS	70.50	70.54	0.04	62.40	62.39	0.01	62.91	62.90	0.01	67.68	67.70	0.02
NPAS	0.58	0.58	-0.00	0.65	0.65	0.00	0.65	0.65	0.00	0.65	0.65	0.00
TOTAL RTN	47.05	47.05	0.00	56.79	56.80	-0.01	62.06	62.06	0.00	63.34	63.35	-0.01
TIMED REN	47.05	[illegible]	0.00	56.79	56.80	0.01	62.06	62.06	0.00	63.34	63.35	0.01
IRG	45.97	[illegible]	0.00	55.36	55.36	-0.00	60.62	60.63	0.01	61.91	61.91	0.00
REN 2 90	1.09	[illegible]	0.00	1.44	1.44	0.00	1.44	1.44	0.00	1.44	1.44	0.00
TOTAL PS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCH GP70	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER PS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CADET	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LOSSES COSTS												
TOTAL	101.51	101.06	0.35	97.57	97.56	0.01	96.94	96.93	0.01	103.21	103.23	0.02
OFF	27.44	27.75	0.31	28.63	28.63	0.00	27.86	27.86	0.00	28.02	28.02	-0.00
ENL RA	74.06	74.11	-0.05	68.94	68.93	0.01	69.08	69.08	0.00	75.19	75.22	-0.03
CADET	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PCS COSTS	643.59	644.14	0.55	762.94	762.89	0.05	776.03	776.01	0.02	637.92	637.98	0.06
SPEC INCENTIVE PAY COSTS	282.61	282.61	0.00	310.23	310.23	0.0	310.23	310.23	0.0	310.23	310.23	0.0
ALLOW + SEP	330.54	330.54	0.00	305.55	305.55	0.00	305.55	305.55	0.00	305.55	305.55	0.00
OTHER COSTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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Chart D displays two manpower programs with the same cost categories as chart C. The programs are designated current and prior and the difference shown as the delta. The heading again identifies the requirement prompting the manpower program being run. This example is the same as that shown in Chart B.

CHART 1: KEY MANPOWER PROGRAM DATA

GRC

CHART 1 KEY MANPOWER PROGRAM DATA
(SCALED IN THOUSANDS)
FISCAL YEAR 1980

ELIM IV
ALTERNATIVE 02?01
12 MAR 1980

LAST MONTH OF HISTORICAL DATA IS JAN 1980

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	
TRAINED STRENGTH													MANYEARS
STRUCTURE SPACES*													
OPERATING STRENGTH	649.1	650.2	651.5	657.9	667.0	670.7	668.0	672.4	661.9	656.6	657.4	657.1	659.5
OPERATING STR DEVIATION*													
TTHS AND USMA	51.8	52.1	55.0	46.5	41.9	41.1	45.1	46.7	51.1	51.2	54.5	50.7	49.5
TRAINEES	61.5	62.8	51.9	61.0	57.6	55.8	51.1	45.1	52.0	57.5	60.5	65.0	55.9
TOTAL STRENGTH	763.6	765.1	759.1	765.5	767.4	767.6	764.2	762.5	767.0	771.1	772.5	774.0	765.9

SELECTED RECRUITING DATA — MALE HSDG PERCENTAGE - 52.6 — TOTAL HSDG PERCENTAGE - 56.7

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
NPS MALE HSDG	9.6	4.2	1.6	4.0	4.0	4.0	3.7	4.7	9.1	9.5	9.1	8.3	70.0
NPS MALE NHSG + GED	7.1	6.9	3.5	8.2	7.5	5.2	2.5	4.1	4.6	4.6	4.4	4.5	63.0
TOTAL NPS MALE	12.7	11.1	5.2	13.0	11.5	10.0	6.2	8.0	14.3	14.0	13.4	12.8	133.0
NPS FEMALE	2.6	2.2	1.0	2.0	1.5	1.5	1.0	1.0	3.6	2.2	2.0	2.0	22.7
TOTAL NPS	15.3	13.3	6.1	15.0	13.0	11.5	7.2	9.0	17.9	16.2	15.4	14.8	155.6
PRIOR SERVICE	1.6	1.2	0.7	1.6	0.9	0.9	1.2	1.2	1.2	1.2	1.2	1.2	14.0
TOTAL OBJ	16.9	14.5	6.8	16.6	13.9	12.4	8.4	11.0	19.1	17.5	16.6	15.9	169.6
ADMIN GAINS..............	1.1	0.1	0.1	0.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.6
TOTAL ACCESSIONS	18.0	14.6	6.9	17.3	14.1	12.6	8.6	11.2	19.3	17.5	16.8	16.1	173.2

INITIAL ENTRY TRAINING (IET)	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
TOTAL TRNG INPUT	18.7	21.6	10.7	15.2	23.6	16.2	12.7	19.6	23.9	21.4	25.8	17.0	227.6
MALE NPS A.A. INPUT	11.8	13.3	5.0	9.3	15.3	10.0	6.0	9.4	12.7	12.7	15.9	12.0	134.7
FEMALE NPS A.A. INPUT ..	2.3	2.6	1.2	1.5	2.1	1.4	1.1	1.2	3.0	2.3	2.4	1.8	22.9
PRIOR SERVICE INPUT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
ROTC TNG INPUT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	3.0
RESERVES TNG INPUT......	4.6	5.7	3.7	4.4	6.3	4.8	4.8	8.0	7.3	5.4	6.7	5.2	66.9
													AVERAGE
UTILIZATION OF IET CAPACITY (PCT)	108.38	115.71	74.78	81.35	126.35	63.65	67.73	104.71	102.44	114.81	107.92	101.09	97.54

NOTE: DUE TO ROUNDING, COMPONENT TOTALS MAY NOT AGREE.

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*These data have been deleted in order to avoid marking this document "FOR OFFICIAL USE ONLY."

This chart is the current version of the original manpower program. It provides information in monthly detail. Data for each fiscal year are on a separate page with data for each month in separate columns and summary data for the year in the right hand column.

The first row of Chart 1 lists the number of structure spaces or total authorizations for the Army force structure. The data normally represent the sum of approved authorizations, however, it may be modified to evaluate results of alternatives in Army policy. These data are jointly developed by ODCSPER and ODCSOPS.

The operating strength shows the actual operating strength up to the last month of historical data (indicated at the top of the chart), and projected operating strength for the remaining months. The next row shows the deviation of operating strength from structure spaces.

Transient, holdee, and student (THS) data are actual or projections except for user-supplied data pertaining to officers. US Military Academy data are also user-supplied.

The selected recruiting data are historical actuals and COMPLIP projections of accessions for user-defined categories of NPS gains. Except when operating in the Career-Force-Optimization (CFO) mode, prior service gains are user inputs.

CHART 1: KEY MANPOWER PROGRAM DATA

CHART 1 KEY MANPOWER PROGRAM DATA
(SCALED IN THOUSANDS)
FISCAL YEAR 1980

ELIM IV
ALTERNATIVE 03/03
12 MAR 1980

LAST MONTH OF HISTORICAL DATA IS JAN FY80

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	MANYEARS
TRAINED STRENGTH													
STRUCTURE SPACES*													
OPERATING STRENGTH	640.1	650.2	651.5	652.9	647.0	670.7	660.0	672.4	661.9	656.6	657.6	652.1	655.5
OPERATING STR DEVIATION*													
TOS AND USMA	51.8	52.1	59.0	56.5	41.9	51.1	45.1	56.7	51.1	57.2	54.5	50.7	49.5
TRAINEES	43.9	47.0	53.9	61.0	57.6	55.0	51.1	45.1	52.0	57.1	60.1	65.0	54.9
TOTAL STRENGTH	741.5	745.1	759.1	765.4	767.4	767.6	766.2	762.3	767.0	771.1	772.7	774.0	765.9

SELECTED RECRUITING DATA MALE HSDG PERCENTAGE = 52.6 TOTAL HSDG PERCENTAGE = 56.7

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
NPS MALE HSDG	5.6	4.2	1.6	4.8	4.0	4.8	3.7	4.7	9.7	9.5	9.1	8.3	70.0
NPS MALE NHSG + GED	7.1	6.9	3.5	8.2	7.5	5.2	2.5	4.1	4.6	4.6	4.4	4.5	63.0
TOTAL NPS MALE	12.7	11.1	5.1	13.0	11.5	10.0	6.2	8.8	14.3	14.0	13.4	12.8	133.0
NPS FEMALE	2.6	2.2	1.0	2.0	1.5	1.5	1.0	1.0	3.6	2.2	2.0	2.0	22.7
TOTAL NPS	15.3	13.3	6.1	15.0	13.0	11.5	7.2	9.8	17.9	16.2	15.4	14.8	155.6
PRIOR SERVICE	1.6	1.2	0.7	1.6	0.9	0.9	1.2	1.2	1.2	1.1	1.2	1.2	14.0
TOTAL OBJ	16.9	14.5	6.8	16.6	13.9	12.4	8.4	11.0	19.1	17.3	16.6	15.9	169.6
ADMIN GAINS...............	1.1	0.1	0.1	0.7	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	5.6
TOTAL ACCESSIONS	18.0	14.6	6.9	17.3	14.1	12.6	8.6	11.2	19.3	17.5	16.8	16.1	171.2

INITIAL ENTRY TRAINING (IET)

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
TOTAL TRNG INPUT	10.7	21.6	10.7	15.2	23.5	16.2	12.7	19.6	23.9	23.9	25.0	17.0	227.6
MALE NPS A.A. INPUT	11.0	13.3	5.0	9.3	15.1	10.0	6.0	9.4	12.7	12.7	15.9	12.0	134.7
FEMALE NPS A.A. INPUT ..	2.3	2.6	1.2	1.5	2.1	1.5	1.1	1.2	3.0	2.3	2.4	1.8	22.9
PRIOR SERVICE INPUT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
ROTC TNG INPUT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	0.0	0.0	3.0
RESERVES TNG INPUT	4.6	5.7	3.7	4.4	6.3	4.0	4.8	8.0	7.3	5.4	6.7	5.2	66.9
													AVERAGE
UTILIZATION OF IET CAPACITY (PCT)	100.39	115.71	74.20	81.35	126.95	69.55	67.75	104.71	102.44	114.81	102.42	101.04	97.54

NOTE: DUE TO ROUNDING, COMPONENT TOTALS MAY NOT AGREE.

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The CFO mode brings the enlisted force into the closest possible agreement with objectives for the strength of year-of-service group--within user specified bounds.

The total recruiting objective is the sum of total NPS and PS gains projections.

Administrative gains include several miscellaneous gains categories such as enlistments that are not reported through the US Army Recruiting Command. These projections are user-supplied.

The last block summarizes the input to initial entry training.

TITLES OF CHARTS 1.1 THRU 10

GRC

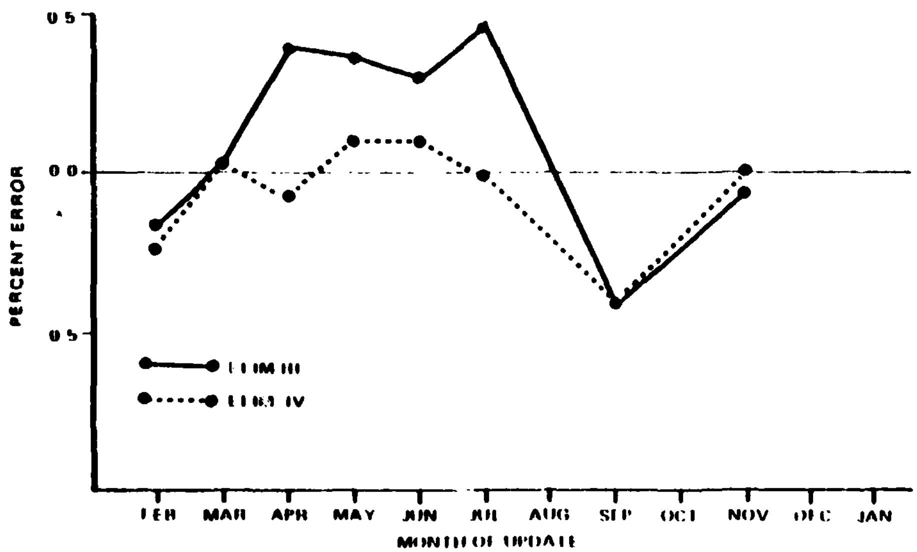
1.1	FIRST TERM ENLISTMENTS BY CHARACTERISTIC GROUP
2	TOTAL STRENGTH, GAINS AND LOSSES
3.1	TRAINING
3.2	TRAINING
4.1	AUS STRENGTH AND LOSS PROJECTION
4.2	RESERVE/NG AND NON-CAREER RA STRENGTH AND LOSS PROJECTION
4.3	CAREER RA STRENGTH AND LOSS PROJECTION
4.5	AUS AND RA STRENGTH AND LOSS PROJECTION
4.2A*	NON-CAREER C-GROUP STRENGTH AND LOSS PROJECTION
4.3A	CAREER C-GROUP RA STRENGTH AND LOSS PROJECTION
4.6A	NON CAREER C GROUP STRENGTH AND LOSS PROJECTION
5	STRENGTH
6	LOSSES
7	GAINS
8	FEMALES
9.1	IMMEDIATE REENLISTMENT GAINS AND LOSSES
9.2	FIRST REENLISTMENTS BY CAREER FORCE OPTIMIZATION
10	TOTAL STRENGTH DISTRIBUTION BY YEARS OF SERVICE

26

There are an additional 13 charts in the AAMMP which provide much more detailed information regarding strengths, gains, and losses broken out in a variety of ways. In addition, there are a great many graphs prepared to aid in analyzing data prepared by the system.

With the extensive data produced and projections so far in the future, the question remains just how accurate are the predictions? The system has a program that computes projection errors by comparing forecasts with currently known actuals. The current ELIM-COMPLIP system is producing strength forecasts that are accurate to within $\pm$ 0.5% for total strength of the Army.

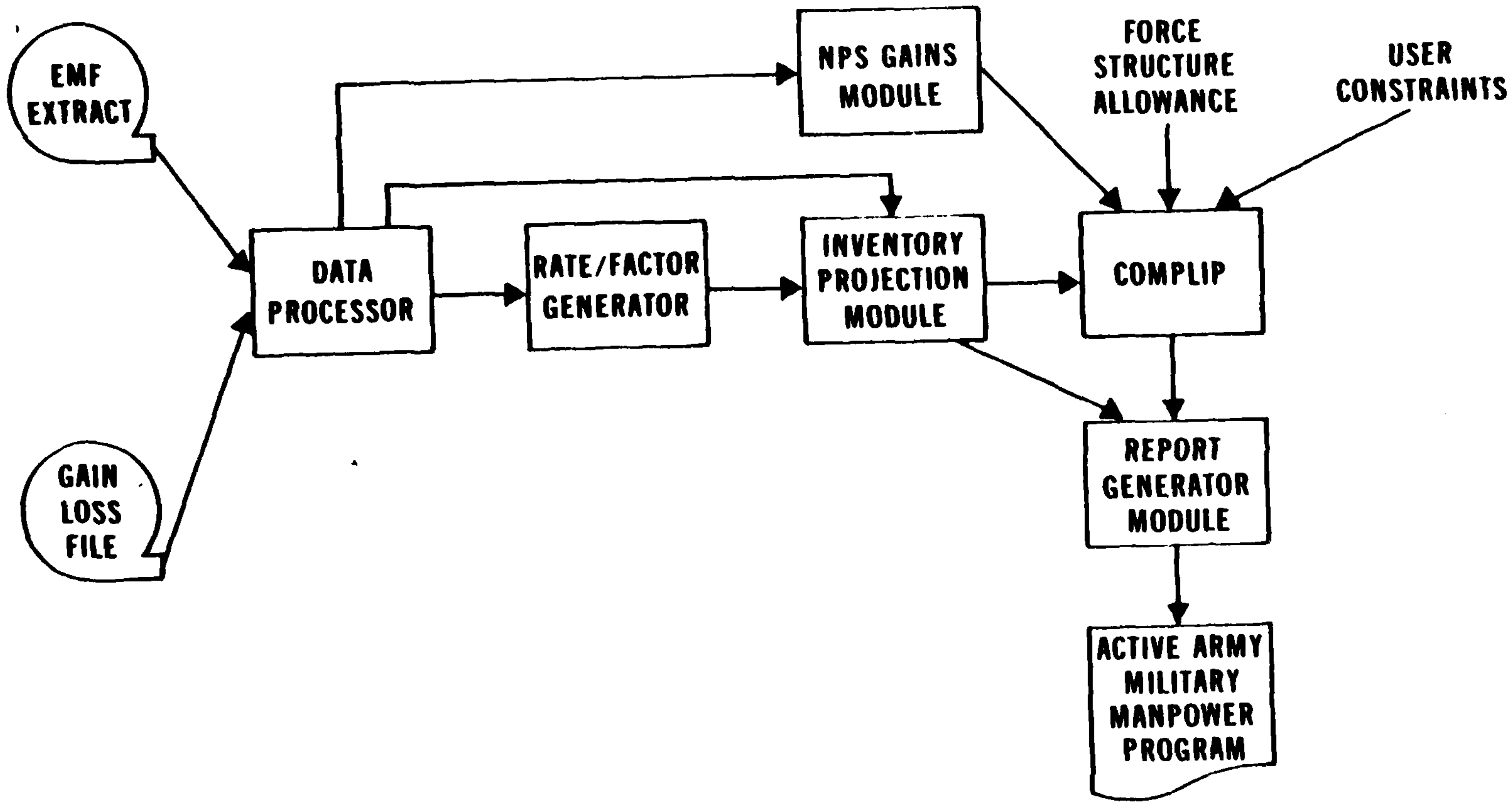
FORECAST ACCURACY



a PERCENT ERROR OF FORECAST OF TOTAL ENLISTED STRENGTH
3 MONTHS AHEAD OF LAST ACTUALS

This slide shows the percent error of enlisted strength forecasts 3 months ahead compared to the actual strength when it becomes known 3 months later. Eight monthly updates are plotted for the current version, ELIM IV. They generally have smaller errors than the previous version, ELIM III. Similar accuracy is obtained for projections 12 or more months beyond the latest actual strength data.

ELIM-COMPLIP SYSTEM SCHEMATIC



28

0087 80

To summarize, the system consists of six basic modules, as shown on this slide. The main data inputs are an extract of the Enlisted Master File and the monthly Gain-Loss File. The data base is updated monthly. Historical data are used to compute loss factors and other rates, and also to make estimates of the number of NPS gains that will be available under different economic conditions and Army policies. The Inventory Projection Module starts with the current enlisted population, broken out by length of service and months remaining to ETS, and projects this population forward in time, using loss rates and other factors supplied by the Rate/Factor Generator. COMPLIP then uses the information supplied by the IPM to compute an optimal manpower program using linear programming. The first objective for optimizing is to bring the structure strength of the Army as close as possible to a given force structure allowance. After this has been done, several further levels of optimization are possible. COMPLIP also allows the user to impose various constraints on the manpower program. Finally, the Report Generator Module combines the information from the IPM and COMPLIP and produces the Active Army Military Manpower Program.

USES OF ELIM-COMPLIP

PLANNING	OPERATING STRENGTHS
	TRAINING REQUIREMENTS
	RECRUITING FORCE
PROGRAMMING	FORECAST STRENGTHS
	ASSESS IMPACT OF CHANGES
BUDGETING	STRENGTH-RELATED COSTS
	MANPOWER AUTHORIZATIONS
POLICY DEVELOPMENT	IMPACT OF PROPOSED CHANGES
PROGRAM PROGRESS	LATEST STRENGTH
	COSTS
	DEVIATIONS IN RECRUITING
	STRENGTH PROJECTIONS
	ACCESSION REQUIREMENTS

This final slide shows again the main uses of the system. ELIM-COMPLIP projects future operating strengths, permitting realistic force structure planning. The system also projects future accession requirements, permitting sound planning of training requirements and size of the recruiting force.

ELIM-COMPLIP provides the official forecast of Army strength and related information to support the Five Year Defense Program. During development of program decisions, ELIM-COMPLIP is used to help assess the impact of changes in planned strength or other changes in Army policy.

Budget estimates of strength-related costs are based on ELIM-COMPLIP. Strength projections from the system are the basis of the Army request for Congressional military manpower authorizations.

As already mentioned, alternative runs of the system are frequently made to asses the impact of policy decisions being considered.

The data base is updated monthly with the latest strength and loss data, and the system is then run using the latest data. These monthly updates of the manpower program serve as the basis for

USES OF ELIM-COMPLIP

GRC

PLANNING	OPERATING STRENGTHS
	TRAINING REQUIREMENTS
	RECRUITING FORCE
PROGRAMMING	FORECAST STRENGTHS
	ASSESS IMPACT OF CHANGES
BUDGETING	STRENGTH-RELATED COSTS
	MANPOWER AUTHORIZATIONS
POLICY DEVELOPMENT	IMPACT OF PROPOSED CHANGES
PROGRAM PROGRESS	LATEST STRENGTH
	COSTS
	DEVIATIONS IN RECRUITING
	STRENGTH PROJECTIONS
	ACCESSION REQUIREMENTS

determining progress against goals in strength, gains, losses, and other areas. The monthly updates also show the future implications of the latest actual data in such areas as personnel costs, deviations from recruiting goals, projections of future operating strength, and future accession requirements. Thus ELIM-COMPLIP is a means to identify areas that need management attention.

In summary ELIM-COMPLIP is a comprehensive system for overall management of Army enlisted strength, with special emphasis on strength projections and requirements for NPS gains.

APPENDIX H

STUDY OVERVIEW - SSI'S PROPOSED MODEL FOR MOBILIZATION MANPOWER MANAGEMENT

CHAPTER 1

STUDY OVERVIEW

Section I. Background.

1. In November 1978, the Office of the Deputy Chief of Staff for Personnel (Manpower, Plans and Budget) requested the Office of the Deputy Chief of Staff for Operations and Plans to direct the Strategic Studies Institute to undertake a study on Army Reserve Components mobilization. The study was to determine the feasibility of validating the currently used mobilization show rates for each Reserve Component, or of developing improved predictions of actual reserve show rates at the time of full mobilization. For the purposes of this study, "show rate" was defined by the study sponsor as the percent of reserve personnel in a given category that would report in accordance with orders issued by proper authority.

2. The study directive stipulated that all categories of pretrained manpower were to be addressed: Selected Reserve (Army National Guard (ARNG) and US Army Reserve (USAR) units), Individual Ready Reserve (IRR), Standby Reserve, and retired military personnel. It also directed that the study should not concern itself with factors other than show rates which may affect the individual reservist's ability to perform military service, and that only a full mobilization environment should be considered. (See Appendix A for the full text of the Study Directive.)

3. The Office of the Assistant Secretary of Defense (Reserve Affairs) expressed interest in the study effort and agreed to support the project by providing funds for participation of outside experts in the feasibility assessment.

Section II. The Problem of Show Rate.

4. US Army personnel managers need reasonably valid estimates of the availability of pretrained manpower for mobilization. To fulfill this need, they must have the capability to make timely and reliable assessments of alternative policies and management decisions which affect the maintenance and readiness of the Reserve Components in peacetime, as well as those alternatives which may operate in the event of a mobilization. Show rate has two uses in the personnel management system: as a gross estimator of the number of reserve personnel who would become employable/deployable assets in the event of a mobilization; and as a means of expressing a management objective of the "yield" in pretrained manpower which the reserve system must generate. In the former instance show rate functions as a measurement tool, whereas in the latter it operates as a management objective.

5. Defense personnel managers use show rates, or more recently yield rates, to establish manpower management goals for the Services in building and maintaining their Reserve Components. This guidance in turn generates a set of Service policies and management initiatives for achieving these goals.

6. When this study was initiated, the Office of the Secretary of Defense (OSD) draft Consolidated Guidance, March 7, 1978 established the following yields as minimum Service management objectives in the 180-day period following a mobilization order:

a. Selected Reserve (ARNG and USAR units): 95%
b. Individual Ready Reserve (IRR): 70%[1]

The OSD draft Consolidated Guidance of February 9, 1979 established an enhanced IRR mobilization yield of no lower than the following:

	FY 81	FY 83	FY 85[2]
IRR Yield Goal	80%	85%	90%

As noted above, OSD expresses current management objectives for the Services in terms of "yield" rates. "Yield" appears to be preferable to "show" in that it does not carry the same implied, perhaps passive, acceptance of the existence of a category of personnel who do not "show." In practice, however, personnel managers still tend to use the terms interchangably. This may cause some degree of confusion between OSD and Service personnel managers. Whereas OSD seeks to establish minimum management objectives or goals for the Services, Service personnel managers face the difficult problem of evaluating the reserve manpower pool and current or proposed policies and procedures to determine if they are making progress toward achieving the OSD goals. These managers need to be able to measure (or where measurement is not feasible, to estimate) with fairly high reliability the employability/deployability of reserve assets, and the impacts of alternative policies and initiatives on these assets. Show rate, or yield, may be adequate to express OSD goals, but it poses serious problems to the Service manager. Single point estimates for Reserve Components as complex and diverse as the ARNG, USAR, and IRR may be wholly inadequate for the difficult task of estimating reserves availability and impacts of alternative policies.

7. The problem addressed by this study was to determine a means of improving confidence in show rate estimates, or of proposing a more reliable and credible system which generates estimates of the employable/deployable force.

Section III. The Study Approach.

8. The study approach to this problem initially envisioned two phases. The first phase was to determine the feasibility of establishing more reliable show rate estimates for each category of reserve manpower. If the results of this phase suggested that it would be feasible to improve show rate estimates, the second phase was to determine the appropriate methods of sampling and surveying to achieve the improved estimates. The study was not to undertake the actual sampling effort itself; the study directive stated that the sampling effort would be a separate and subsequent exercise.

9. To support the investigation in phase one, the study team reviewed Department of the Army (DA) regulations, and DA and Office of the Secretary of Defense (OSD) guidance governing Reserve Component assets and mobilization. From the Office of the Assistant Secretary of Defense (Reserve Affairs), (OASD(RA)) Official Guard and Reserve Manpower Strengths and Statistics, the team prepared a reserve force profile and analysis. Summaries of the experience gained in mobilizations from World War II to Vietnam were extracted from other studies and analyzed. Finally, the team reviewed previous OSD, Army, and other Service efforts to analyze and quantify show rates. From all these materials a study brief was prepared which acted as a data base manual for the remainder of the study. (See Appendix F, Supporting Data Base and Analysis for the Phase 1 Interim Report, for the summary of these materials.)

10. A panel of seven outside experts was then assembled to review this data and analyses and assist the study team in appraising the feasibility of improving show rate predictions. Three experts, knowledgeable of the Army reserve components and experienced with Army survey sampling,[3] were drawn from other Army agencies. Four experts, knowledgeable of the most current survey methods and analysis, were selected from academic institutions and research firms.[4] While the findings and conclusions were based on the panel assessments, responsibility, of course, rests with the study team.

Section IV. Phase One Findings, Conclusions and Recommendations.

11. General. This section summarizes the findings, conclusions, and recommendations of the Phase One Interim Report delivered to the study sponsor on 23 March 1979. The full text of this report is available from Dr. H. R. Ludden, DAPE-MBP.

12. Findings on Reserve Component Categories.

a. A careful examination of the base profile data for each element of the Reserve Components (the US Army National Guard, US Army Reserve units, Individual Ready Reserves, Standby Reserve, and retired military personnel) indicates that there are significant differences among them. These differences are reflected in the size, composition, demographic character, organizational structure, and statutory basis of each Reserve Component. Therefore, the significance of these differences must be acknowledged in any system which estimates the employability/deployability of the Reserve Components. (See Appendix F, Supporting Data Base and Analysis, Sections II through VII.)

b. The Individual Ready Reserve is quite different from the Selected Reserve. It is comprised of a younger population--more transient and more remote from Army management procedures--whose members are not accustomed to participating in readiness training for mobilization, as are the Selected Reserve members. While this population is highly important to the Army's mobilization requirements, it is much more removed from ready mobilization access and appears less motivated by a sense of obligation to the Service or the country. (See Appendix F, Supporting Data Base and Analysis, Section V.)

c. The Standby Reserve was examined only briefly. Because of a recent policy decision to retain people in the IRR through their obligated service period, the Standby Reserve will erode to a small body of temporarily assigned personnel. Further investigation was not considered warranted. Moreover, the draft Consolidated Guidance of February 9, 1979 relieves the Services of considering the Standby Reserve (active status) as a source of pretrained manpower for full mobilization after FY 81, and eliminates the Standby Reserve (inactive status) as a resource effective immediately. (See Appendix F, Supporting Data Base and Analysis, Section VI.)

d. Retired Regular Army and retired Reserve Component personnel were not seriously considered or explicitly managed as potential mobilization assets until recently. The Army is now preparing a management system and support data base for these personnel; the system should be in operation by FY 1980. Given the current inadequacy of data for this population, investigation of its mobilization potential and determination of the appropriate factors to be applied should be postponed until the data base is operational. (See Appendix F, Supporting Data Base and Analysis, Section VII.)

13. Findings on Previous Mobilizations.

a. Previous partial, or sequential total, mobilizations provide the most meaningful data available. However, the different circumstances of each mobilization, the differences in size, makeup, structure and statutes applying at the time, and the mobilization objectives make each mobilization unique. Further, there were no standardized records kept on the past mobilizations. Thus, although past historical data are useful as indicators, the data are insufficient for exact predictions for future full mobilizations.

b. The World War II mobilization was a total mobilization, but it took place over an extended time period. The three mobilizations since World War II have been partial mobilizations, calling only a fraction of the force to active duty. Attempts to apply these experiences to future full mobilizations would be misleading. They can be used to identify potential problem areas and critical factors; they cannot provide reliable quantitative estimates of the factors. For example, in the post-World War II mobilizations there were losses to mobilizing units (sometimes as high as 20 percent) between the first indication that a mobilization order was going to be issued and the date the unit was to report to its mobilization station. Unit commanders of mobilized units were almost always highly successful in making up for these initial losses by recruitment from nonmobilized units and among local prior service personnel. Thus the overall 95 percent-plus show rates reported for many mobilized units failed to take into account the units' losses prior to their reporting dates, and these losses were not counted against unit "show." Also, the erosion of the manpower reservoir in other units, and possibly in the IRR, resulting from attempts to bring units up to strength was not taken into account. In the event of a future full mobilization, such transfers of pretrained assets would degrade later mobilizing assets in a manner which is not recognized in existing estimating procedures.

The draft DoD Minuteman Training Study appears to have failed to take these processes into account when it developed an estimate of unit show rate. In any future full mobilization it can be expected that such early losses will occur and that resourceful commanders of early mobilizing units will again seek to make up early losses by canvassing among later-mobilizing units and elsewhere. The current concept of show rate does not account for these early losses or the replacements which a unit commander is quickly able to recruit on his own initiative. (See Appendix F, Supporting Data Base and Analysis, Section IX.)

14. Findings on Previous Studies of Show Rate.

a. Previous efforts to study the mobilization process and determine the mobilized end strength of one or more elements of pretrained manpower generally avoid coming to grips with show rates. Several studies address themselves to a more general term, such as "availability," or the more current "yield rate." Clearly, redefinition of a concept or a problem which has posed insurmountable difficulties in the past is an acceptable approach to the solution, but only to the extent that the redefinition clarifies and makes manageable the elements of the problem.

b. US Army Military Personnel Center, Report on the Results of November 1976 Special Survey of Mobilization of Reserve Personnel (Survey #46-76-S).

(1) This study, undertaken as a part of MOBEX 76, adopted "availability" as its operational concept. In lieu of a physical member count, a sample survey was used to discover how quickly "available" IRR personnel would be able to report assuming conditions of a full mobilization. In addition to questions about demographics, the survey questionnaire asked if a person were physically ready, needed retraining, or intended to request a delay or an exemption. Although 10 percent of the questionnaires were undeliverable, which were part of the 65 percent nonresponse rate, the study concluded that these undeliverables would represent a significant portion of the reservists who would not be available for a timely departure to mobilization stations. Furthermore, even though the MOBEX 76-selected IRR personnel were identified as unique unit filler requirements, the study did not assume the survey results would be representative of the entire IRR population.

(2) The survey results indicated that about 97 percent of the officers and 89 percent of the enlisted personnel were physically ready; that 76 percent and 83 percent of the officers and enlisted personnel, respectively, required minimal additional training (no more than 14 days); and that 83 percent and 79 percent, respectively, did not require a delay or an exemption beyond 30 days. The study noted, however, that a person might very readily respond that he/she could report for duty quickly in the knowledge that this was not an actual mobilization. In an actual mobilization there likely would be more delays in reporting and more requests for exemption than indicated by the survey data.

(3) The survey results are limited in usefulness to support generalizations about the entire IRR population. MOBEX 76, intended as a full mobilization exercise, turned out to be a "partial" one in terms of filler requisitions: only 39 percent of the IRR population was requisitioned, and this fraction was the target population for the survey. Additionally 11 percent of the IRR population were excluded from the exercise and subsequently from the survey because they were: due for transfer to standby or due for discharge (no stop-loss); temporarily physically disqualified; females except nurses; males less than age 18; or those preassigned to early deploying units. Although demographic data may be highly correlated between the MOBEX 76 selected personnel and the other half of the IRR population, this does not warrant an assumption that the results of the qualitative questions can be extrapolated to the nonsurveyed population without significant statistical variance. Nevertheless, this study was referenced, and used extensively by, the draft DoD Minuteman Training Study as supporting its estimation of availability rates for IRR officers and enlisted personnel.

c. Recent Air Force studies (The USAFR Individual Mobilization Resource, Vol. I: The Individual Ready Reserve, July 1977, and Vol. II: The Standby Reserve, October 1977) clarify partially the mobilization management problem. In the IRR study the focus was on a "yield potential," defined by a relatively simple flow model which first dropped chaplain candidates, medical students, legal interns, Category D mobilization augmentees, officers programed for active duty, nonprior service airmen awaiting initial training, and dual status officers. Also, ten percent were excluded for physical or other reasons. It estimated that 30 percent would request a delay or exemption, and 10 percent would not be located on the first effort. By M+150, disapproval of delays/exemptions, expired delays, and correcting bad addresses finally yields 80 percent of the IRR for active duty (53 percent of the officers, 88 percent of the airmen). The data supporting these estimates appear sound, and the initiation of a crude flow model (with the understanding that refinements are going to be pursued) is a step in the proper direction. There were, however, three shortcomings: (1) the estimates hide more than they reveal of the mobilization process and look more like mobilization management objectives rather than predictors; (2) the flat estimates do not allow the manager to vary his estimates of percentage rates which might be encountered under varying circumstances prompted by actions of Congress or the President, that is, testing the flexibility of the model in simulating a range of mobilization scenarios; (3) the model fails to account for the fact that there will be "no-shows" and fails to give the manager the means of estimating them and their impact on the system.

d. A recent "Proposed Evaluation of Reserve Show Rates" prepared by Information Spectrum, Inc., for the US Navy does not significantly improve this situation. It proposes to survey sample among reservists if they are: locatable, would volunteer and report in 60 days, are physically qualified, and under 58 years of age. It will ask if the person will voluntarily report in 60 days, and whether he will need more than 30 days notification. This effort takes into account even fewer of the factors which affect availability; it also excuses a sizeable body of people from the survey, and fails to account for "no-shows." Perhaps its most serious problem is its basis in the

belief that people, asked in a survey to think about some hypothetical future situation, can be relied upon to predict their own future behavior. From both the panel discussions and the materials provided by the panel participants, it was clear that there is much study and survey evidence that this is not the case. At best survey respondents can provide information on their current attitudes and beliefs. Given a carefully prepared and administered survey instrument, a knowledgeable researcher may be able to extrapolate aggregate behavior patterns within fair confidence limits, but only as long as the future circumstances surrounding the expected behavior are well defined.

e. The reports of commanders' estimates of unit personnel availability undertaken during MOBEX 78 are now available. In a preliminary way it was a useful survey, indicating possible ranges of key factors deserving further investigation. (The Alabama survey available to the study team showed estimates of losses ranging from 0 to 30 percent.) A far more useful result might have been achieved if each commander had been encouraged to explain in detail his rationale, and then reinforced this with focused discussion with his unit members.

f. The draft DoD <u>Minuteman Training Study</u> has already been mentioned. It is useful to add here a point that seems to have been overlooked in the subsequent use to which its percentage availability estimates have been put. This study stressed that its estimates should be viewed as a hypothesis needing further investigation, noting that the Selected Reserve statistics have some basis in historical fact (discussed above), and that the IRR estimates have little empirical evidence to support them. It encouraged further investigation and recommended that a model be developed as sounder data became available. The 1979 draft <u>Consolidated Guidance</u> appears to have ignored those caveats when it established the new "yield" guidance for the IRR.

15. <u>Conclusions</u>.

a. As a personnel management tool for estimating the number of deployable/employable manpower, "show rate" is inadequate and misleading for the following reasons:

(1) It does not recognize or deal with explicit relationships between management policies and the impact of those policies upon the reserve components;

(2) It fails to acknowledge the known complexities and diversities in the composition of the pretrained manpower pools;

(3) It fails to reveal the assumptions and policy judgements personnel managers will make in their analysis of a mobilization process;

(4) It is based on inaccurate analysis of the historical evidence, and pays no regard to the existing data on the Reserve Components, and

(5) There is no scientifically supportable procedure to developing a single show rate estimate for each Reserve Component manpower pool.

b. The concepts of "show" and "show rate" should be replaced by a more detailed set of factors and then be drawn into a larger instrument which takes into account and integrates all the factors which influence the mobilization process. In this new context, factors such as failure to report due to lack of or late notification, belief that one is no longer obligated for active service, belief that one has a justifiable case for exemption, or that one shares a popular resentment over the circumstances of the mobilization, could be identified and analyzed. Then these factors could be integrated with other known factors in the mobilization process in a manner which is both scientifically sound and supportive of management decisionmaking.

c. The existing data base and analytical programs of the Reserve Components Personnel and Administration Center (RCPAC) already maintain and routinely update much of the information required by a more comprehensive mobilization management instrument. If the idea of the new instrument were adopted, a relatively simple model could be developed as a prototype for evaluation. Subsequent refinements to the instrument would be determined by management experience with its use. These refinements may require initial field research and survey sampling, and may ultimately be incorporated into the existing routine data collecting and processing procedures.

16. Recommendations. These Phase One conclusions led to the following recommendations:

a. That use of show rate as a management predictor of pretrained deployable/employable manpower be discontinued; and

b. That a comprehensive mobilization management instrument be developed.

17. Study Sponsor Decision. After the study team briefed the sponsor's Study Advisory Group (SAG), the study sponsor adopted the above recommendations and directed that Phase 2 as originally defined be terminated. In lieu of Phase 2, the sponsor requested that a preliminary conceptual design of a mobilization manpower management model be developed.

Section V. Development of a Concept for the Proposed Model.

18. Approach.

a. Upon receipt of revised guidance from the study sponsor to proceed with the development of a concept for the proposed model, the study team:

(1) Reviewed the personnel data bases to determine the appropriate levels of manpower profile detail which these data bases could support;

(2) Reviewed Army regulations and directives and prepared a preliminary list of factors which might affect portions of the manpower pool as they passed through the mobilization process; and

(3) Determined the flexibility required of the model to meet the diverse requirements of Army personnel managers.

b. Two workshops were organized by the study sponsor to review development of the concept and provide additional guidance on user requirements.

19. Conceptual Framework for the Proposed Model.

a. The conceptual framework for the proposed model is displayed in the following three figures.

(1) Figure 1 shows the guiding principle for the model. There exists a set of explicit, systematic relationships between the reservoir of pretrained manpower and the net employable manpower. The model provides the user the flexibility of analysis in either direction: starting with the reservoir an assessment can be made of each factor which affects retention or loss of manpower through the mobilization process; or, beginning with an end employable manpower requirement, the manager can backtrack through the process to assess the policies and parameters governing the size and maintenance of an adequate reservoir.

(2) Figure 2, an expansion of figure 1, shows the interrelationship between the unit and the individual reservist mobilization processes. This flow diagram identifies both delays and losses to units and to the reservoir of pretrained individuals. It also shows that some delays or necessary reassignments of unit members become losses to a unit. These losses, however, are not treated as losses to the Army, for these people become part of the pretrained individual filler flow.

(3) Figure 3 depicts a processing of manpower in a mobilization which is the principal linkage between reservoir of pretrained manpower and employable manpower. The figure identifies several general categories of factors which operate to influence not only the size of the employable force but the timeliness of an individual's employability. At this point, factors can be applied to units and individuals who report for mobilization processing. These factors, and the degree to which they are applied, help to determine the number of delayed accessions and the number of Army losses. Similarly, these factors can be applied to assess the number of individuals who fail to report initially, but will subsequently enter the system after they are located.

b. Chapter II expands this conceptualization into a description of the operational components of the proposed model and how users may manipulate the model to support their specific requirements.

20. Recommendation. In view of the high potential of the proposed model to support Army personnel manager requirements, this study recommends that the sponsor undertake the development of the model.

GENERAL FRAMEWORK

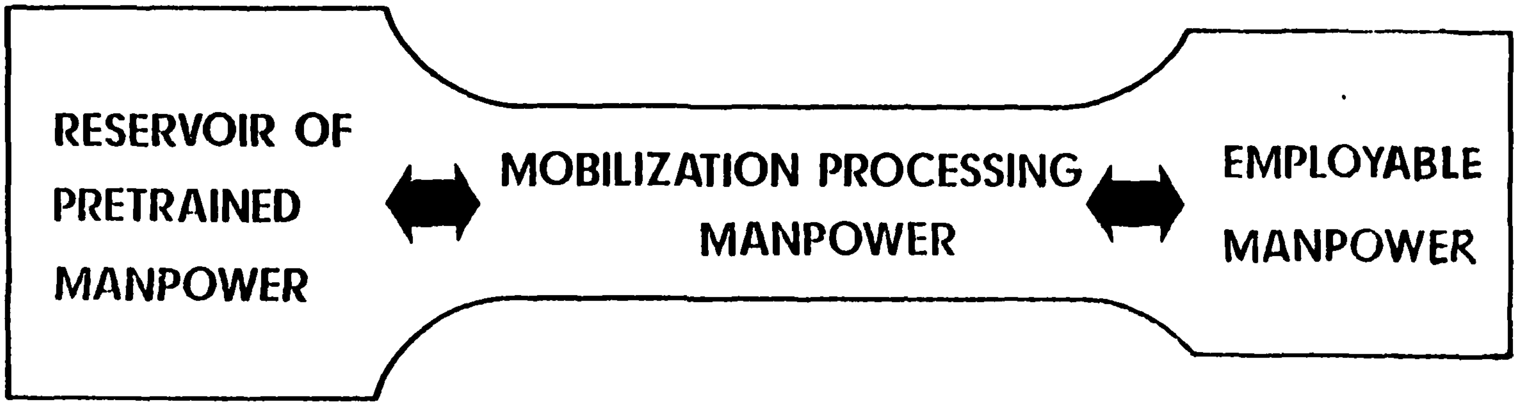


Figure 1

UNIT AND INDIVIDUAL FRAMEWORK

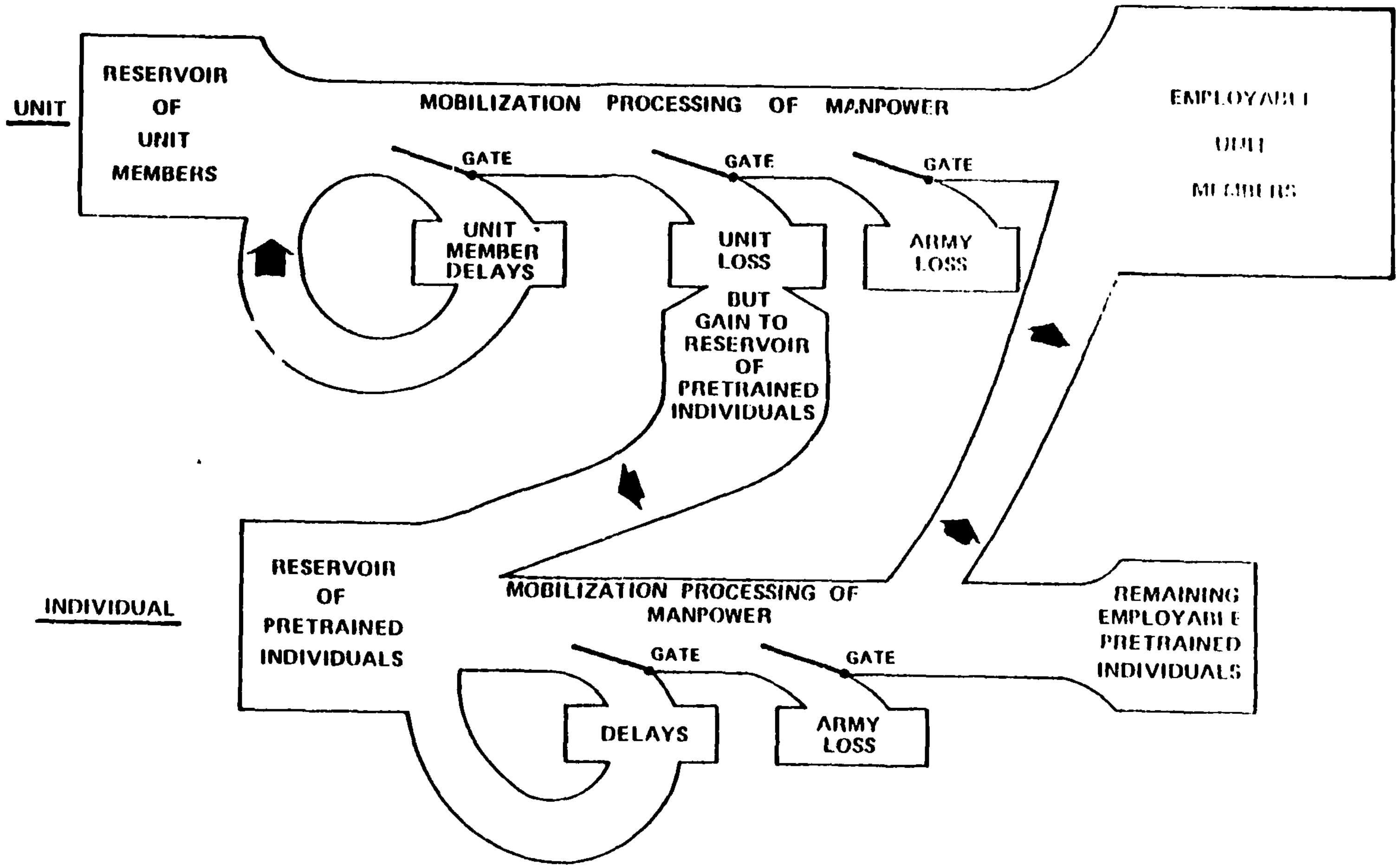
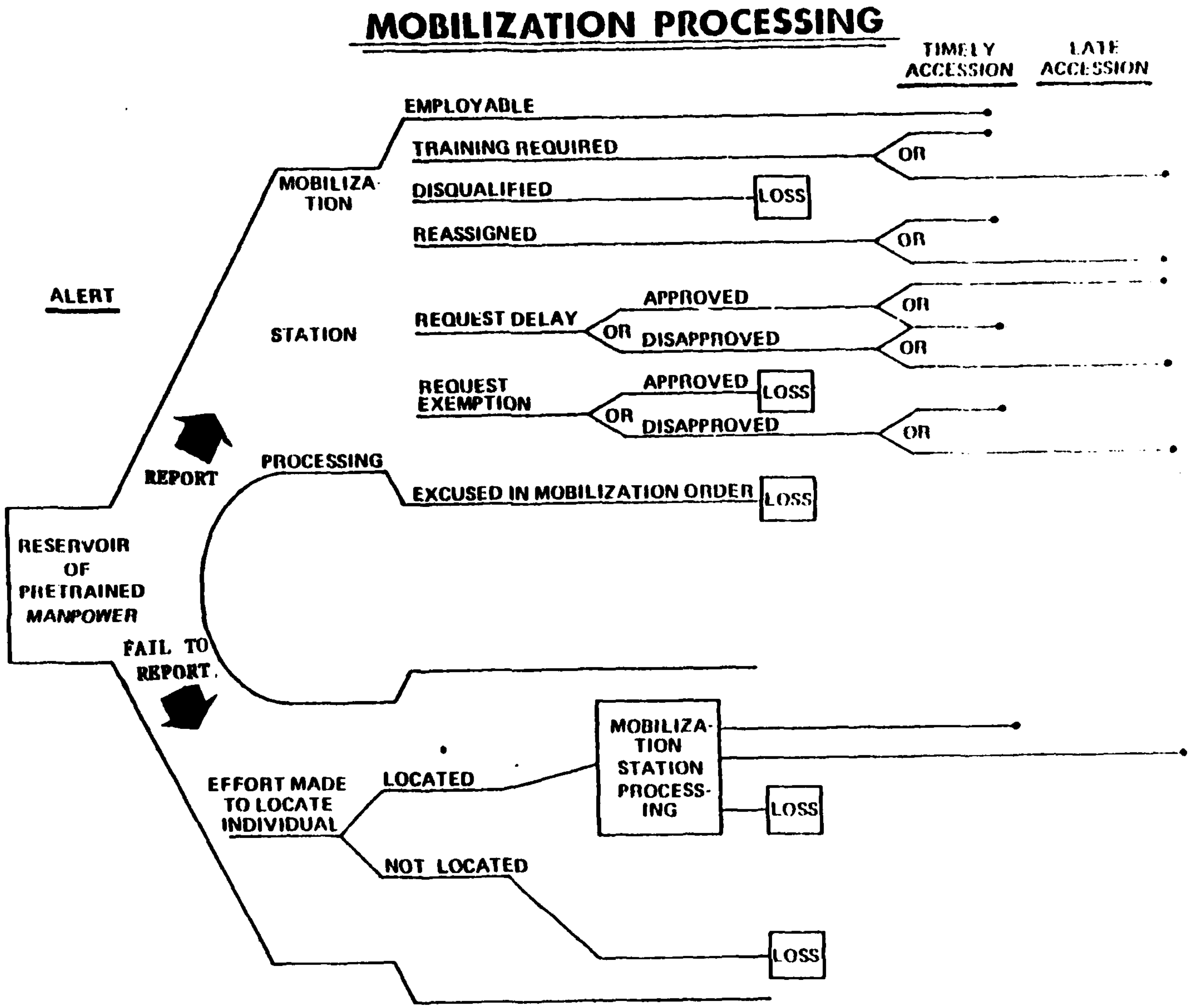


Figure 2



MOBILIZATION PROCESSING
TIMELY ACCESSION
LATE ACCESSION
ALERT
RESERVOIR OF PRETRAINED MANPOWER
REPORT
FAIL TO REPORT
MOBILIZATION STATION PROCESSING
EMPLOYABLE
TRAINING REQUIRED
OR
DISQUALIFIED
LOSS
REASSIGNED
OR
REQUEST DELAY
OR
APPROVED
OR
DISAPPROVED
OR
REQUEST EXEMPTION
OR
APPROVED
LOSS
DISAPPROVED
OR
EXCUSED IN MOBILIZATION ORDER
LOSS
EFFORT MADE TO LOCATE INDIVIDUAL
LOCATED
MOBILIZATION STATION PROCESSING
LOSS
NOT LOCATED
LOSS

Figure 3

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